CQ

January 1959
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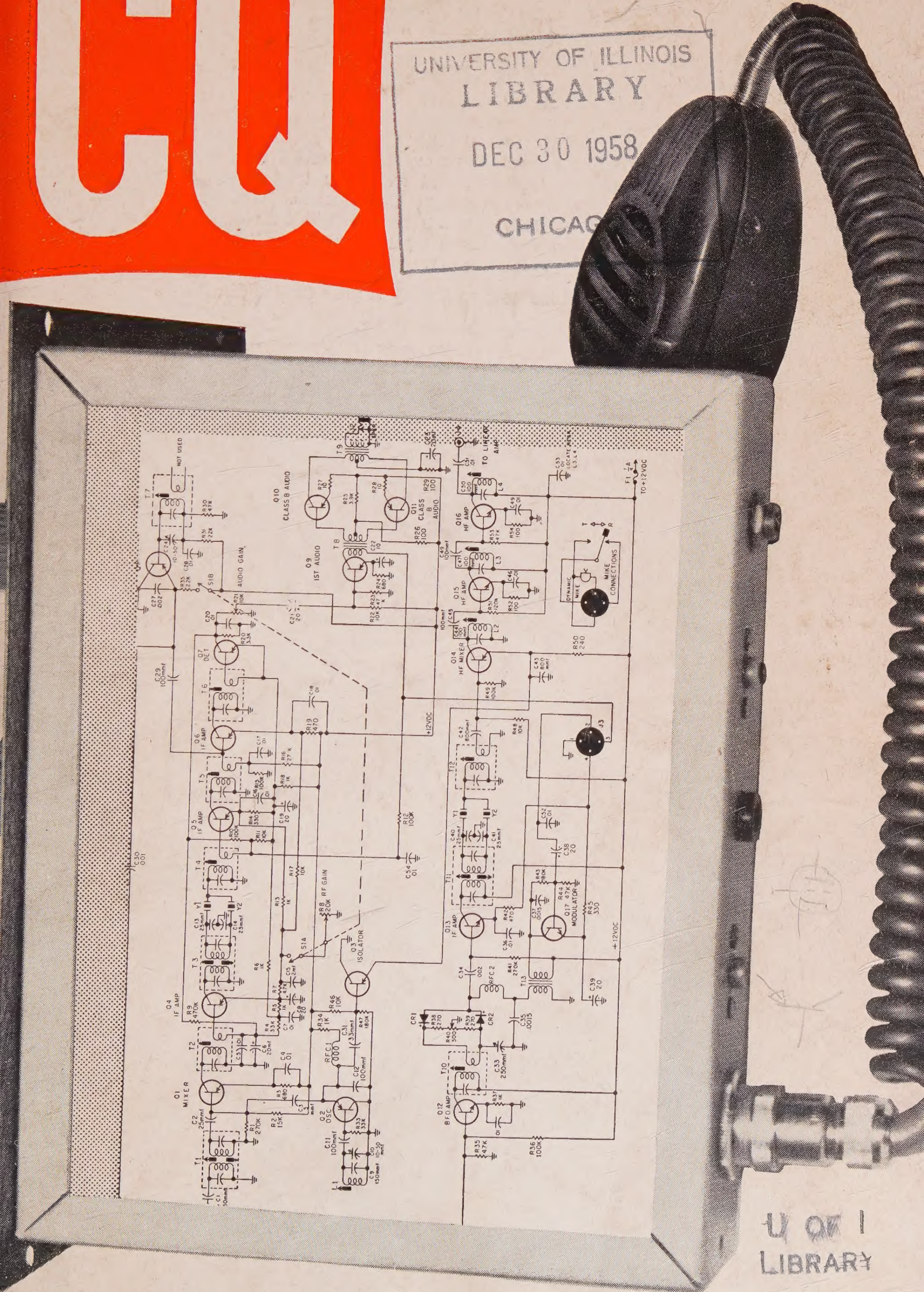

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The Radio Amateur's Journal

S\ LINE

\SYSTEM ENGINEERED — Engineered as a communication *system,* Collins new S/ Line offers exceptional SSB performance and operating convenience. Incorporated are such time-proven features as Mechanical Filter sideband generation and detection; stable, permeability-tuned VFO; crystal controlled high frequency oscillator; RF inverse feedback, and automatic load control. Simplified SSB design promises minimum maintenance. Operate transmitter and receiver separately or as a transceiver with the receiver VFO controlling. Operated with maximum legal power on SSB with the 30S-1 Linear Amplifier (available soon).

See the S/Line now, on display at your Collins distributor.

COLLINS

For further information, check number 1 on pa

There's a PR for every Service!

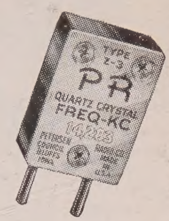
AMATEUR

40, 80 and 160 Meters, PR Type Z-2

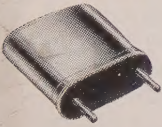
Rugged. Low drift, fundamental oscillators. High activity and power output. Stands up under maximum crystal currents. Stable, long-lasting, permanently sealed; ±500 cycles.................. **$2.95 Net**

20 Meters, PR Type Z-3

Third overtone oscillator. Low drift. High activity. Can be keyed in most circuits. Fine for doubling to 10 and 11 meters or "straight through" 20 meter operation; ±500 cycles........................ **$3.95 Net**



24 to 27 Mc., PR Type Z-9A



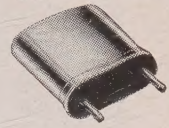
Third overtone; multiplies into either 2-meter or 6-meter band; hermetically sealed; calibrated 24 to 27 mc., ±3 kc.; .050″ pins.

$4.95 Net

50 to 54 Mc., PR Type Z-9A

Fifth overtone; for operating directly in 6-meter band; hermetically sealed; calibrated 50 to 54 mc., ±15 kc.; .050″ pins.

$6.95 Net



SPECIAL TYPES

Commercial Crystals available from 100 Kc. to 70 Mc. Prices on request.

Type Z-1, AIRCRAFT

3023.5 Kc., .005%................................ **$3.45 Net**

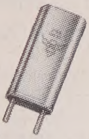
Type Z-1, MARS and CAP

Official assigned transmitter frequencies in the range.
Calibrated to .005%. 1600 to 10000 Kc. **$3.45 Net**

Type Z-6A
FREQUENCY STANDARD

To determine band-edge. To keep the VFO and receiver properly calibrated.

100 Kc. . . . . **$6.95 Net**



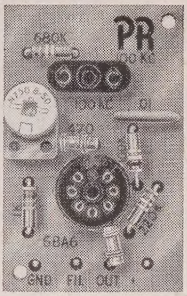
PR PRINTED OSCILLATOR KIT

Has many uses—

- As 100 Kc. Marker
- As 1000 Kc. Marker for Check Points up to 54 Mc.
- As Foundation Circuit for Low Frequencv SSB Crystals

Assembled in minutes. Kit contains everything but 6BA6 oscillator tube and crystal.

Each . . . . . **$4.50 Net**



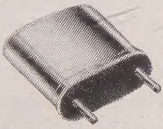
Type 2XP

Suitable for converters, experimental, etc. Same holder dimensions as Type Z-2.

1600 to 12000 Kc. (Fund.) ±5 Kc. . . . **$3.45 Net**

12001 to 25000 Kc. (3d Mode) ±10 Kc. . . . **$4.45 Net**

VHF Type Z-9R, Aircraft



For Lear, Narco and similar equipment operating in the 121 Mc. region, requiring crystals in 30 Mc. range.

Each . . . . **$4.95 Net**

Type Z-9A RADIO CONTROLLED OBJECTS

27.255 Mc., .005% . . . **$4.25 Net**

Type Z-1
TV Marker Crystals

Channels 2 through 13 . . . . . **$6.45 Net**
3100 Kc. . **$2.95 Net**
4100 Kc. . **$2.95 Net**
4.5 Mc. Intercarrier, .01% . . . **2.95 Net**
5.0 Mc. Sig. Generator, .01% **2.95 Net**
10.7 Mc. FM, IF, .01% . . . **2.95 Net**

ALL PR CRYSTALS ARE UNCONDITIONALLY GUARANTEED. ORDER FROM YOUR JOBBER.

PETERSEN RADIO COMPANY, INC.

2800 W. BROADWAY • COUNCIL BLUFFS, IOWA

EXPORT SALES: Royal National Corporation, 250 W. 57th Street, New York 19, N. Y., U. S. A.
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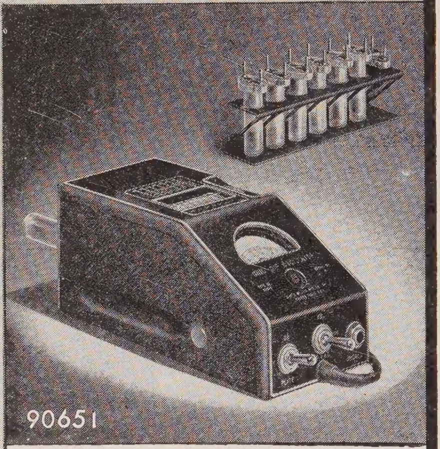
Designed for Application



The No. 90651

GRID DIP METER

The No. 90651 MILLEN GRID DIP METER is compact and completely self contained. The AC power supply is of the "transformer" type. The drum dial has seven calibrated uniform length scales from 1.5 MC to 300 MC plus an arbitrary scale for use with the 4 additional inductors available to extend the range to 220 kc. Internal terminal strip permits battery operation for antenna measurement.

JAMES MILLEN
MFG. CO., INC.

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CQ, the Radio Amateurs' Journal is published fo active hams by active hams. Not affiliated with an clubs or other political groups, CQ endeavors to be a true and honest reporter for those interested in the hobby. Suggestions for improvement are welcomed.

Authors would do well to send for the CQ Styl sheet which will explain our confused system of abbreviations and symbols. The article "Author Author' (October 1952 CQ) tells all about how to writ articles for CQ, how much we pay, etc. Reprints o this article are available from CQ if you have bee improvident in keeping up your radio library.

CQ CERTIFICATES:

The WPX Award is granted for two-way contac with certain number of amateurs in different prefixe of the world. Full details are contained in the WP Record Book which is available for 15c from CQ. Application forms are free.

The WAZ Award is granted for contacting all o the amateur zones of the world. Current standings o amateurs working for this award will be found in th DX column. A DX Zone map of the world is availabl free from CQ. Send stamped envelope.

TECHNICAL INFORMATION:

Please check the 11-year cumulative index which wa published in the January 1956 CQ for informatio about articles in past issues of CQ. The Decembe 1956 to 1958 CQ yearly indexes will bring you up t date. Most back issues are available at $1 from us Check our "Back Issue" ad for details on those no available. Reprints of the Cumulative Index are available free. For further information see the Ham Clini column.

DISCLAIMER:

The authors and editors do the best they can t make everything as correct as possible in the articles If for any reason any of them should happen to goo we hasten to point out that everything is experimenta and we guarantee nothing.

←For further information, check number 4 on page 126

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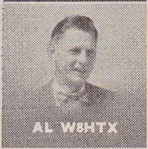
AL W8HTX

All of these licensed radio amateurs make important contributions to the Heath line of fine ham kits. In a sense, they are your personal representatives within the company, because their design ideas and performance preferences reflect not only their own "on-the-air" experiences, but those of the amateur fraternity with which they are in constant contact.

With this kind of representation in Benton Harbor, you can continue to rely on high-performance Heathkit amateur radio equipment designed by hams, for hams!

REX K8GND

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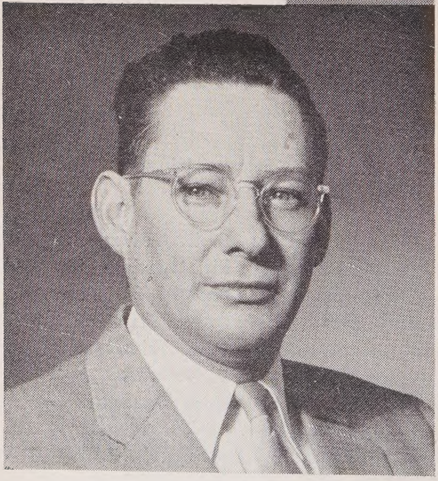

ROGER MACE (W8MWZ)
SENIOR HAM ENGINEER
HEATH COMPANY

HEATHKIT 50-WATT CW TRANSMITTER KIT

MODEL DX-20

$35.95

If high efficiency at low cost in a CW transmitter interests y you should be using a DX-20! It employs a single 6DQ6A t in the final Amplifier stage for plate power input of 50 watts. T oscillator stage is a 6CL6, and the rectifier is a 5U4GB. Sing knob band-switching is featured to cover 80, 40, 20, 15, 11 a 10 meters, and a pi network output circuit matches anter impedances between 50 and 1000 ohms to reduce harmo output. Designed for the novice as well as the advanced cl CW operator. The transmitter is actually fun to build, even fo beginner, with complete step-by-step instructions and picto diagrams. All the parts are top-quality and well rated for th application. "Potted" transformers, copper-plated chassis, a ceramic switch insulation are typical. Mechanical and electri construction is such that TVI problems are minimized. If y desire a good clean CW signal, this is the transmitter for y Shpg. Wt. 19 lbs.

HEATHKIT "APACHE" HAM TRANSMITTER KIT

- Newly Designed VFO—Provision For S.S.B. Adapter
- Modern Styling—Rotating Slide Rule Dial

MODEL TX-1 **$229.50** Shipped motor freight unless otherwise specified. $50.00 deposit required on C.O.D. orders.

Fresh out of the Heath Company laboratories, the brand-new "Apache" model TX-1 Ham Transmitter features modern styling and is designed as a handsome companion to the also-new Heathkit "Mohawk" receiver. The "Apache" is a high quality transmitter operating with 150 watt phone input and 180 watt CW input. In addition to CW and phone operation, the "Apache" features built-in switch selected circuitry providing for single-sideband transmission through the use of a plug-in external single-sideband adapter. These Heathkit adapters will be available in the near future. A compact, stable and completely redesigned VFO provides low drift frequency control necessary for single-sideband transmission. An easy-to-read slide rule type illuminated rotating VFO dial with vernier tuning provides ample bandspread and precise frequency setting. Simple band-switching control allows flip-of-the-wrist selection of the amateur bands on 80, 40, 20, 15 and 10 meters (11 M with crystal control). The "Apache" features adjustable low level speech clipping and a low distortion modulator stage employing two of the new 6CA7/EL-34 tubes in push-pull class AB operation. Time sequence keying is provided for "chirpless" break-in CW operation. The final amplifier is completely enclosed in a perforated aluminum shielding for greater TVI protection and transmitter stability. Cabinet comes completely preassembled with top hatch for convenient access without taking chassis out of cabinet. Die-cast aluminum knobs and front panel escutcheons add to the attractive styling of the transmitter. Pi network output coupling matches antenna impedances between 50 and 72 ohms. Incorporates all the refinements necessary with many "plus" features for effective and dependable communications. Shpg. Wt. 115 lbs.

...top quality at lowest prices!

HEATHKIT "MOHAWK" HAM RECEIVER KIT

- All Critical Circuits Prewired and Aligned
- Crystal Controlled Oscillators for Drift-Free Reception

MODEL RX-1 **$274.95** Shipped motor freight unless otherwise specified. $50.00 deposit required on C.O.D. orders.

Outstanding results can be expected with the new "Mohawk" receiver which is designed to combine all the necessary functions required in a high quality communications receiver. A perfect companion for the Heathkit "Apache" transmitter, the "Mohawk" features the same wide-band slide rule type vernier tuning and covers all of the amateur bands from 160 through 10 meters on seven bands with an extra band calibrated to cover 6 and 2 meters using a converter. External receiver powered, accommodations are available for these converters which will be available in Heathkits soon. The "Mohawk" is specially designed for single-sideband reception with crystal controlled oscillators for upper and lower sideband selection. A completely preassembled, wired and aligned front end assures ease of assembly. All critical wiring is done for you insuring top performance. This 15-tube receiver features double conversion with IF's at 1682 kc and 50 kc. Five selectivity positions from 5 kc to 500 CPS. A bridged T-notch filter is employed for maximum heterodyne rejection. Complete accuracy is obtained with the use of a built-in 100 kc crystal calibrator and the set features 10 db signal-to-noise ratio at less than 1 microvolt input. S-meter and many other fine features built-in for top-notch signal reception. Shpg. Wt. 90 lbs.

HEATH COMPANY A Subsidiary of Daystrom, Inc. BENTON HARBOR 12, MICH.

HEATHKIT PHONE & CW TRANSMITTER KIT

MODEL
DX-40

$64.95

The DX-40 incorporates the same high quality and stability as the DX-100, but is a lower powered rig for crystal operation, or for use with an external VFO. Plate power input is 75 watts on CW, permitting the novice to utilize maximum power. An efficient, control-carrier modulator for phone operation peaks up to 60-watts, so that the rig has tremendous appeal to the general class operator also. Single-knob switching covers 80, 40, 20, 15, 11 and 10 meters. Pi network output coupling makes for easy antenna loading, and pi network interstage coupling between the buffer and final amplifier improves stability and attenuates harmonics. A line filter is incorporated for power line isolation. The efficient oscillator and buffer circuits provide adequate drive to the 6146 final amplifier from 80 to 10 meters, even with an 80-meter crystal. A drive control adjustment is provided, and the function switch incorporates an extra "tune" position so that the buffer stage can be pretuned before the final is switched on. A switch selects any of three crystals, or a jack for external VFO. High quality D'Arsonval meter for tuning. Shpg. Wt. 26 lbs.

HEATHKIT DX-100 PHONE & CW TRANSMITTER KIT

MODEL
DX-100

$189.50

Shipped motor freight unless otherwise specified. $50.00 deposit required on C.O.D. orders.

You get more for your transmitter dollar when you decide on a DX-100 for your ham shack! Recognized as a leader in its power class, the DX-100 offers such features as a built-in VFO, built-in modulator, TVI suppression, pi network output coupling to match a variety of antenna impedances from 50 to 600 ohms, pi network interstage coupling, and high quality materials throughout. Copper plated 16-gauge steel chassis, ceramic switch contacts, etc., are typical of the kind of parts you get, in assembling this fine rig. The DX-100 covers 160, 80, 40, 20, 15, 11 and 10 meters with a single bandswitch, and with VFO or crystal operation on all bands. RF output is in excess of 100 watts on phone and 120 watts on CW, with a pair of 6146 tubes in parallel for the final amplifier, modulated by a pair of 1625 tubes in parallel. VFO tuning dial and panel meter are both illuminated for easy reading, even under subdued lighting conditions. Attractive front panel and case styling is completely functional, for operating convenience. Designed exclusively for easy step-by-step assembly. No other transmitter in this power class combines high quality and real economy so effectively. Here is a transmitter that you will be proud to own. Time payments are available! Shpg. Wt. 107 lbs.

more fine ham gear from the pioneer

HEATHKIT GRID DIP METER KIT

A Grid Dip Meter is basically an RF Oscillator used to determine the frequency of other Oscillators, or tuned circuits. Numerous other applications such as pretuning, neutralization, locating parasitics, correcting TVI, adjusting antennas, designing new coils, etc. Features continuous frequency coverage from 2 MC to 250 MC, with a complete set of prewound coils, and a 500 ua panel meter. Has sensitivity control and a phone jack for listening to the "Zero-Beat". It will also double as an absorption-type wave meter. Shpg. Wt. 4 lbs.

MODEL GD-1B

$21.95

Low frequency coil kit: two extra plug-in coils extend frequency coverage down to 350 KC. Shpg. Wt. 1 lb. No. 341-A **$3.00**

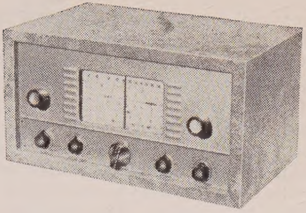
HEATH COMPANY A Subsidiary of Daystrom, Inc. BENTON HARBOR 12, MICH.

HEATHKIT ALL-BAND COMMUNICATIONS-TYPE RECEIVER KIT

Ideal for the short wave listener or beginning amateur, this Receiver covers 550 KC through 30 MC in four bands. It provides good sensitivity and selectivity, combined with fine image rejection. Amateur bands are clearly marked on the illuminated dial scale. Features transformer type—power supply—electrical band spread—antenna trimmer—separate RF and AF gain controls—noise limiter—internal 5½" speaker—head phone jack and AGC. Has built-in BFO for CW reception. An accessory power socket is also provided for connecting the Heathkit model QF-1 Q Multiplier. Will supply 250 VDC at 15 ma and 12.6 VAC at 300 ma. Shpg. Wt. 12 lbs.
Cabinet: Fabric covered cabinet with aluminum panel as shown part 91-15A. Shpg. Wt. 5 lbs. **$4.95**

MODEL AR-3

$29.95



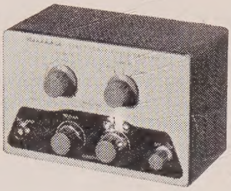
ALL-BAND RECEIVER

HEATHKIT ELECTRONIC VOICE CONTROL KIT

Here is a new and exciting kit that will add greatly to your enjoyment in the ham shack. Allows you to switch from Receiver to Transmitter merely by talking into your microphone. Lets you operate "break-in" with an ordinary AM transmitter. A terminal strip is provided for Receiver and speaker connections and also for a 117 volt antenna relay. Unit is adjustable to all conditions by sensitivity and gain controls provided. Easy to build with complete instructions provided. Requires no transmitter or Receiver alterations to operate. Shpg. Wt. 5 lbs.

MODEL VX-1

$23.95



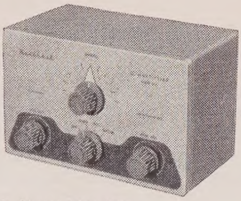
ELECTRONIC VOICE CONTROL

HEATHKIT "Q" MULTIPLIER KIT

This fine Q Multiplier is a worthwhile addition to any communications, or Broadcast Receiver. It provides additional selectivity for separating signals, or will reject one signal and eliminate a etrodyne. Functions with any AM Receiver having an IF frequency between 450 and 460 KC that is not AC-DC type. Operates from your Receiver power supply, and requires only 6.3 VAC : 300 ma (or 12.6 VAC at 150 ma), and 150 to 250 VDC at 2 ma. Simple to connect with cable and plugs supplied. Effective Q of approximately 4000 for sharp "peak" "null". A tremendous help on crowded phone CW bands. Shpg. Wt. 3 lbs.

MODEL QF-1

$9.95



"Q" MULTIPLIER

NOTE: $10.65 WHEN ORDERED WITH AR-3 BECAUSE OF EXCISE TAX.

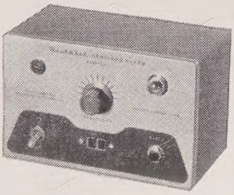
. . . in do-it-yourself electronics!

EATHKIT "AUTOMATIC" CONELRAD LARM KIT

signed to give instant warning whenever a monitored station es off the air, the CA-1 automatically cuts the AC power to ur transmitter, and lights a red indicator. Works with any dio receiver; AC-DC—transformer operated—battery powered, long as the receiver has AVC. A manual "reset" button is proled to reactivate the transmitter. Incorporates a heavy-duty 6-pere relay, a thyratron tube, and its own built-in power supply. neon lamp shows that the alarm is working. mple to install and connect with complete in-uctions provided for assembly and operation. pg. Wt. 4 lbs.

MODEL CA-1

$13.95



"AUTOMATIC"
CONELRAD ALARM

HEATHKIT VARIABLE FREQUENCY OSCILLATOR KIT

Enjoy the convenience and flexibility of VFO operation by obtaining this fine variable frequency oscillator. It covers 160-80-40-20-15-11 and 10 meters with three basic oscillator frequencies. Better than 10 volt average RF output on fundamentals. Requires 250 volts DC at 15 to 20 ma, and 6.3 VAC at 0.45 a, available on most transmitters. It features voltage regulation for frequency stability, and has illuminated frequency dial. VFO operation allows you to move out from under interference and select the portion of the band you want to use without having to be tied down to only 2 or 3 frequencies through the use of crystals. "Zero in" on the other fellows signal and return his CQ on his own frequency! Shpg. Wt. 7 lbs.

MODEL VF-1

$19.50

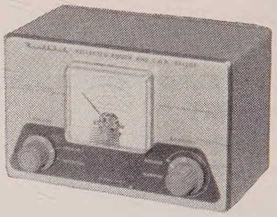
VARIABLE FREQUENCY OSCILLATOR

HEATHKIT REFLECTED POWER METER KIT

A necessity in every well equipped ham shack, the model AM-2 lets you check the match of the antenna transmission system, by measuring the forward and reflected power or standing wave ratio. Handles up to one kilowatt of energy on all bands from 160 to 2 meters, and may be left in the antenna system feed line at all times. Input and output impedances for 50 or 75 ohm lines. No external power required for operation. Meter indicates percentage forward and reflected power, and standing wave ratio from 1:1 to 6:1. Shpg. Wt. 3 lbs.

MODEL AM-2

$15.95



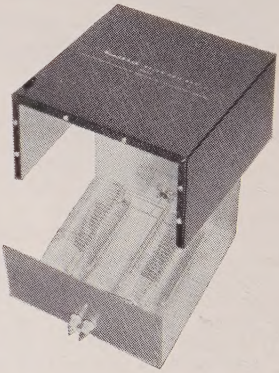
REFLECTED POWER METER

HEATHKIT BALUN COIL KIT

This convenient transmitter accessory has the capability of matching unbalanced coax lines, used on most modern transmitters, to balanced lines of either 75 or 300 ohms impedance. Design of the bifilar wound Balun Coils will enable transmitters with unbalanced output to operate into balanced transmission line, such as used with dipoles, folded dipoles or any balanced antenna system. Can be used with transmitters and Receivers without adjustment over the frequency range of 80 through 10 meters. Will handle power inputs up to 200 watts. Shpg. Wt. 4 lbs.

MODEL B-1

$8.95



BALUN COIL

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FREE 1958 Catalog

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For further information, check number 5 on page 126.

Letters to the Editor

SSB Dinner

Dear Wayne:

It would be appreciated if you would get the following nformation to the ham fraternity. The Eighth Annual Single Side Band Dinner and ham-fest will be held on Tuesday, March 24, 1959 at the Hotel Statler Hilton, 33rd St. and 7th Ave., New York City.

This affair is again under the sponsorship of the Single Side Band Amateur Radio Association. All amateurs and their friends are invited to attend. Prominent nanufacturers of ham equipment will display their prodicts in a large display area, adjacent to the main ballroom. The equipment display area will open at 10:00 A.M. This annual affair has become a traditional "must" of he I.R.E. week. The 1958 dinner was a sell-out, so this ear we have provided for much larger banquet and isplay facilities.

The well known radio and T.V. personality, Bill eonard, W2SKE, will be the master of ceremonies. We vill also have a prominent public figure as the guest peaker. . . . And, of course, valuable door prizes to the icky ticket holders. Avoid the last minute rush and save. Tickets purchased in advance are $8.00 each, at the oor $9.00. Y.L.'s and X.Y.L.'s are cordially invited. Send our checks now for reservations to Irv Binger, W2CMM, 741 Andrews Ave., New York 53, N.Y.

73's
Irv Richter, W2IVW
Chairman, Publicity Committee
Single Side Band Association

Rebuttal

ear Editor,

This letter is a rebuttal to the first letter in the "Letters The Editor" in the October CQ. First and foremost t me say the Coast Guard IS NOT fouled up. I've spent bout 27 years in the Coast Guard during which time ve been a radio ham and think I know what I'm talking bout. The Coast Guard is a 4.0 outfit and I'm sure the indreds of seasoned radio hams in the Coast Guard are my opinion.

Louis Haake has a book at his elbow which is called Coast Guard Communications Manual" and in it he n find the proper procedure to go through to operate radio ham station both ashore and afloat in the Coast uard.

73
Johnny Johnson, W2ZYX
105 Champlain Ave.,
Staten Island 6, New York

Cruise

ar Sir:

The United States Coast Guard Cutter SPAR returned om a four month cruise in Arctic waters on 25 Sepnber 1958.

During the period of this cruise the ship was fortunate having on board an Amateur Radio Station operated "Win" Dietz, Chief Electricians Mate of the SPAR. ief Dietz is W1WIN in "ham" circles.

During the cruise the crew (64) of the SPAR made ny phone patches to their families and friends back ne. This is a tremendous morale booster to one who is lated for long periods from those nearest and dearest him.

The amateur radio operators who gave their time and ipment in relay of SPAR's traffic are too numerous write individually. However, as your magazine receives le coverage in Amateur Radio Circles the Commanding cer of the SPAR would like very much to have you nt in a future issue of your fine magazine the SPAR's p appreciation and sincerest thanks to all the amateur radio operators who worked the SPAR this past summer and kept us in contact with our families. The following is a list of "hams" who worked phone patches for the SPAR.

W1KKR
W1MOW
W1CFE
W1YZG
W1ZPG
W1NNS
W1GR
W1KIB
W1KXM
W1ZRO
W1LOS
W1KLE
W1EZW
K1CDM
W1FTT
K2MAP
W2SIM
W2AFQ
W2IH
K2USA
K2AAA
K2JHA
W2CAA
W2KXL
W2EXK
W2YFB
W3EDA
W3EHA
W3LIN
W3TNO
W3NIG
K4BUJ
K4AJ
K4KCV
W4IEN
W4IZ
W4FFD
W4YSY
K8DZQ
W8LIO
W8CYJ
W8LEA
W9RUK
W9WIH
W0YNZ

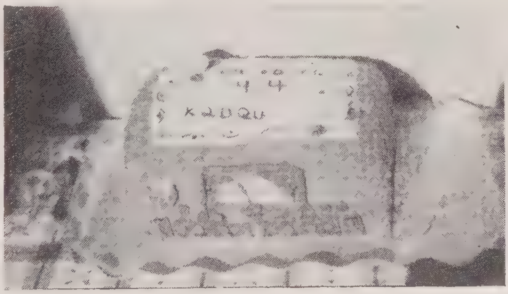
C. V. Cowling
Lieutenant, USCG
Commanding Officer
U. S. Coast Guard Cutter SPAR

Happy Birthday

Dear Wayne:

Here is a picture of the surprise I got on my birthday. Since my brother's birthday our family has been buying birthday cakes from a YL, Katherine Hrdlicka, who bakes them for a hobby so I thought I'd get a cake (hi), but not like this. (By the way if you haven't already guessed, it's an edible replica of my Valiant.) Well, 73 and wish you were here,

Bruce Dembling, K2DQU



Apology

Dear Wayne:

I'm writing this as a letter of apology to the many hams back stateside that will be looking for me from Andorra (PX1) between the 14th and 20th of December. Honest, I wanted to go, and thought everything was all OK up until the 10th of October. That's when the axe fell and chopped off all hope. It cut right through the reciprocal vein. Yes that's the whole story, but I'll give a few more details for those who care to go on.

It all started last July when I found that I was being transferred from here in Morocco up to Germany this December. Well, I've always heard that Andorra was rather rare DX, for the AM and SSB boys, so I thought that I would pack up my new DX-100B and beat up 75-A-2 and head on up and stop off in Andorra for a week or so and see what DX I could work. The first thing I did was to get off a hot letter to PX1YR, who as you know is the only ham in Andorra's 6000 pop. Well, that letter must have been so hot, skin friction from moving so fast, that it burned or something, any way I never received an answer from Yves. I followed up with another letter to him with the same results.

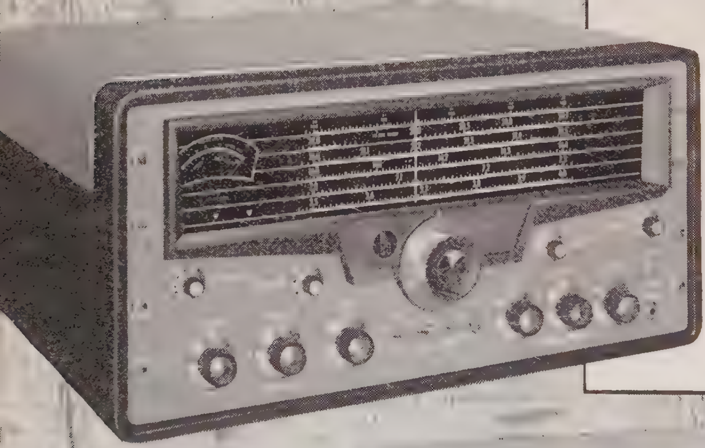
[Continued on page 60]

Big signa

HT-33

Linear Amplif

SX-101 Mark IIIA Receiver



Heavyweight champion
in stability, performanc

SX-101 MARK IIIA is setting new sta
ards for dependability and ruggedn
throughout the amateur world. It's
amateur; provides complete covera
and every technical feature desired
years to come.

FREQUENCY COVERAGE: Band
30.5-34.5 Mc. Band 2–3.48-4.02
Band 3–6.99-7.31 Mc. Band 4–13
14.415 Mc. Band 5–20.99-21.52
Band 6–26.9-29.8 Mc. Band 7–10
WWV.

FEATURES: Complete coverage of
ham bands plus a 2 and 6 meter co
band–80, 40, 20, 15, 10 meters. La
slide rule dial. Band-in-use scales
dividually illuminated. Illuminated

Available with
convenient terms
from your Radio
Parts Distributor

HT-32A

Transmitter

The *new* ideas in
amateur radio are born at

effortless performance!

Beautifully engineered with extra-heavy-duty com-
ponents, the HT-33A is *conservatively rated* at the
naximum legal limit. You are guaranteed one of
he big signals on the band, plus the effortless per-
ormance that means so much to efficiency and
ong life. (Conforms to F.C.D.A. specifications.)

REQUENCY COVERAGE: Complete coverage of
mateur bands; 80, 40, 20, 15, 10 meters.

EATURES: Rated *conservatively* at the maximum
egal input. Third and fifth order distortion products
own in excess of 30 db. Built-in r.f. output meter
reatly simplifies tune-up. All important circuits
netered. Maximum harmonic suppression obtained
rough pi-network. Variable output loading. Pro-
ection of power supply assured by circuit breaker.
IT-33A is a perfect match to Hallicrafters' famous
IT-32 in size, appearance and drive requirements.

IRCUIT DETAILS: This power amplifier utilizes a
L-172 high efficiency pentode operating in class
.B1 or AB2. The tube is grid-driven across a non-inductive resistor, thus assuring the maximum stability under all possible conditions. Band switching is accomplished by one knob which selects the proper inductance value for each band. The output circuit is a pi-network with an adjustable output capacitor, so loads from 40 to 80 ohms may be accommodated. A d.c. milliameter may be switched to various circuits to measure the following: Cathode current, grid current, screen current, plate voltage, and r.f. voltage across the output line for tune-up.

TUBES: (1) PL-172 high power pentode; (2) 3B28 rectifiers; (4) OA2 screen regulators.

FRONT PANEL CONTROLS: Meter selector; Filament switch; High Voltage switch; Bias adjustment; Band switch; Plate tuning; Plate loading.

PHYSICAL DATA: Gray and black steel cabinet (matches HT-32) with brushed chrome knob trim. Size: 8¾" x 19" (relay rack panel). Shipping wt. approx. 130 lbs.

REAR CHASSIS: Co-ax input; co-ax output; filament and bias fuse; cutoff bias relay terminals; screen fuse; ground terminal.

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ieter. Dual scale S-meter. S-meter zero point inde-
endent of sensitivity control. S-meter functions
ith AVC off. Special 10 Mc. position for WWV.
ual conversion. Exclusive Hallicrafters' upper-
wer sideband selection. Second conversion oscil-
tors quartz crystal controlled. Tee-notch filter.
ull gear drive from tuning knob to gang condens-
-s—absolute reliability. 40:1 tuning knob ratio.
uilt-in precision 100 kc. evacuated marker crystal.
ernier pointer adjustment. Five steps of selectivity
om 500 cycles to 5000 cycles. Precision tempera-
re compensation plus Hallicrafters' exclusive pro-
iction heat cycling for lowest drift. Direct coupled
ries noise limiter for improved noise reduction.
nsitivity—one microvolt or less on all amateur
nds. 52 ohm antenna input. Antenna trimmer.
elay rack panel. Heaviest chassis in the industry—
39 cold rolled steel. Double spaced gang condens-
. 13 tubes plus voltage regulator and rectifier.
werline fuse.

FRONT PANEL CONTROLS: Main tuning knob with 0-100 logging dial. Pointer reset, antenna trimmer, tee-notch frequency, tee-notch depth, sensitivity, band selector, volume, selectivity, pitch (BFO), response—(upper-lower-sideband). AVC on/off, BFO on/off, ANL on/off, Cal. on/off, Rec./standby.

TUBES AND FUNCTIONS: 6CB6, R.F. amplifier—6BY6, 1st converter—12 BY7A, high frequency oscillator—6BA6, 1650 kc. i.f. amplifier—12AT7, dual crystal controlled 2nd conversion oscillator—6BA6, 2nd converter—6C4, 1st 51 kc. i.f. amplifier—6BA6, 2nd 51 kc. i.f. amplifier—6BJ7, detector, A.N.L., A.V.C.—6SC7, 1st audio amplifier & B.F.O.—6K6, audio power output—6BA6, S-meter amplifier—6AU6, 100 kc. crystal oscillator—OA2, voltage regulator—5Y3, rectifier.

PHYSICAL DATA: 20" wide, 10½" high and 16" deep—Panel size 8¾" x 19"—weight approximately 74 lbs. (Conforms to F.C.D.A. specifications.)

---

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e most critical!

w proven superior — vastly superior — is Halli-
fters' exclusive 5.0 mc. quartz crystal filter system.
st practical *high frequency* filter, provides un-
cedented rejection of unwanted sideband—50 db.
more—and *world's cleanest signal.*
other major advance: Bridged-Tee Modulator,
nperature stabilized and compensated.

ATURES: 5.0 mc. quartz crystal filter—rejection
db. or more. Bridged-tee modulator. C.T.O. di-
t reading in kilocycles to less than 300 cycles
m reference point. 144 watts plate input (P.E.P.
-tone). Five band output (80, 40, 20, 15, 10
ers). All modes of transmission—CW, AM,
.B. Unwanted sideband down 50 db. or more.
tortion products down 30 db. or more. Carrier
pression down 50 db. or more. Both sidebands
nsmitted on A.M. Precision gear driven C.T.O.
lusive Hallicrafters patented sideband selection.
garithmic meter for accurately tuning and carrier level adjustment. Ideal CW keying and break-in operation, Push To Talk and full voice control system built in. Phone patch input provided. Keying circuit brought out for teletype keyer.

FRONT PANEL CONTROLS, FUNCTIONS AND CONNECTIONS: Operation—power off, standby, Mox., Cal., Vox.—P.T.T. Audio level 0-10 R.F. level 0-10. Final tuning 80, 40, 20, 15, 10 meters. Function—Upper sideband, lower sideband, DSB, CW. Meter compression. Calibration level 0-10. Driver tuning 0-5. Band selector—80, 40, 20, 15, 10 meters. High stability, gear driven V.F.O. with dial drag. Microphone con. Key jack. Headphone monitor jack.

TUBES AND FUNCTIONS: 2-6146 Power output amplifier. 6CB6 Variable frequency oscillator. 12BY7 R. F. driver. 6AH6 2nd Mixer. 6AH6 3rd Mixer. 6AB4 Crystal oscillator. 12AX7 Voice control. 12AT7 Voice control. 6AL5 Voice control. 12AX7 Audio Amp. 12AU7 Audio amp. and carrier Oscillator. 12AU7 Diode Modulator. 12AT7 Sideband selecting oscillator. 6AH6 1st Mixer. 6AH6 4.95 Mc. Amp. 6AU6 9.00 Mc. Amp. 5R4GY HV Rectifier. 5V4G LV Rectifier. OA2 Voltage Regulator.

REAR CHASSIS: Co-ax antenna connector. FSK jack A.C. accessory outlet. Line fuse. Control connector. AC power line cord. Cabinet 20" wide, 10½" high, and 17" deep. Approximate shipping weight 86 lbs. (Conforms to F.C.D.A. specifications.)

The
allicrafters Company
Chicago 24, Ill.

For further information, check number 6 on page 126.

How To Pass FCC COMMERCIAL RADIO OPERATOR License Exams

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Tells where to apply and take FCC examinations, location of examining office, scope of knowledge required, approved way to prepare for FCC examinations, positive method of checking your knowledge before taking the examination.

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City .... Zone......... State..........

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CQ-48

Deer Hon. Ed:

Are just having a cupple horribul eggspeeryances. One being more horribul than other. No, Hon. Ed., I not meening about when you sending back letter on acct. I only putting three sents on it, altho that pretty sneeky way to telling me you not wanting reeding Hon. Scratchi's letters.

Homsumever, that why Scratchi telling you about both horribul things that happening—wanting to getting moneys worth on for sents I putting on this letter. So, here coming horribul thing number one. Maybe you not thinking it horribul, Hon. Ed., maybe you thinking it funny.

Going down street minding own busyness when having to slowing down on acct. bunch of kids in street with hoolahoops. Stopping when seeing hoops are made out of aloomimum, and wondering if can buying some to using for antenna. That making me thinking are just putting new halo antenna on car for mobile rig, so turning it on to testing.

Just after pressing mike button all kids suddenly yelling bloody Hon. Murder, and if you think Scratchi staying around to finding out why then you not reely thinking at all. No indeedy, it not taking 1/c geenyus to knowing that hoolahoops being resonant or something. I not mind giving feller Hon. Hotfoot now and then, but can you imagine having red-hots hoola-hoop around your waste?

Are still shaking from horribul eggspeeryance number one when going home and walking rite into horribul ditto number to. You knowing old Hon. Latin saying: caveat emptor. That meening not going in cave unless it being empty. Hon. Ed., how could I getting in trubble by just going on air? That cave surely being empty, you not thinking?

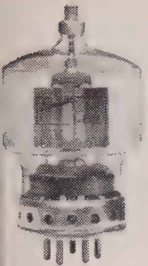
Anyhow, getting on air, calling seek-you, and hooking up with amchoor from middle-west. First cupple minutes having normal QSO. Each of us making with the RST's, the WX, the RIG, the HANDLE and the QSL PSE rooteen. Scratchi can seeing this not going to raysing his intelligence level, so desiding to cut things short.

[Continued on page 90]

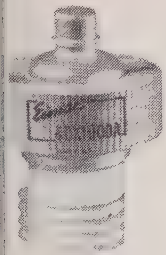
EIMAC FIRST... for all band transmission

CW SSB AM

4-65A


4-400A

4E27A/5-125B


4CX1000A

4-65A Radial-Beam Power Tetrode

Smallest of the Eimac internal-anode tetrodes, the 4-65A has a plate-dissipation rating of 65 watts and is ideal for deluxe mobile as well as fixed-station service.

	CW	AM	SSB
Plate Voltage	3000v	2500v	3000v
Driving Power	1.7w	2.6w	0
Input Power	345w	275w	195w

4-400A Radial-Beam Power Tetrode

Ideal for high power amateur rigs, it will easily handle a kilowatt per tube in CW, AM or SSB application. Forced-air cooling is required.

	CW	AM	SSB
Plate Voltage	3000v	3650v	4000v
Driving Power	6w	4w	0
Input Power	1000w	1000w	1000w

4E27A/5-125B Radial-Beam Power Pentode

The Eimac 4E27A/5-125B is intended for use as a modulator, oscillator or amplifier. The driving-power requirement is very low, and neutralization problems are simplified or eliminated entirely.

	CW	AM	SSB
Plate Voltage	3000v	2500v	4000v
Driving Power	1w	2w	0
Input Power	500w	380w	360w

4CX1000A Ceramic Power Tetrode

Specifically designed for SSB operation, the ceramic-metal 4CX1000A Class AB, linear-amplifier tube achieves maximum rated output power with zero grid drive.

	SSB
Plate Voltage	3000v
Driving Power	0
Input Power	2700w

4CX250B Ceramic Power Tetrode

A compact, rugged tube unilaterally interchangeable in nearly all cases with the famous 4X150A, with the advantages of higher power and easier cooling.

	CW	AM	SSB
Plate Voltage	2000v	1500v	2000v
Driving Power	2.8w	2.1w	0
Input Power	500w	300w	500w

4-125A Radial-Beam Power Tetrode

The versatile tube that made screen grid transmitting tubes popular. This favorite for commercial, military and amateur use is radiation cooled.

	CW	AM	SSB
Plate Voltage	3000v	2500v	3000v
Driving Power	2.5w	3.3w	0
Input Power	500w	380w	315w

4-250A Radial-Beam Power Tetrode

A high power output tube with low driving requirements. A pair of Eimac 4-250A's easily handle a kilowatt input in AM, CW or SSB service.

	CW	AM	SSB
Plate Voltage	3000v	3000v	4000v
Driving Power	2.6w	3.2w	0
Input Power	1035w	675w	660w

4CX300A Ceramic Power Tetrode

A new ceramic-metal high power tetrode designed for rugged service. Will withstand heavy shock and vibration and operate with envelope temperatures to 250° Centigrade.

	CW	AM	SSB
Plate Voltage	2500v	1500v	2500v
Driving Power	2.8w	2.1w	0
Input Power	625w	300w	625w

Information on these popular tubes for amateur applications is available from our Amateur Service Department.

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SAN CARLOS, CALIFORNIA
The World's Largest Manufacturer of Transmitting Tubes

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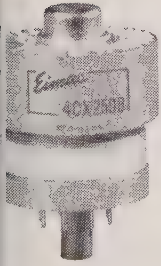
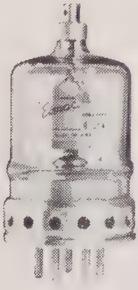
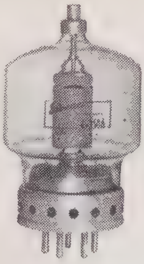
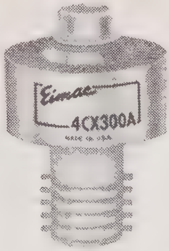
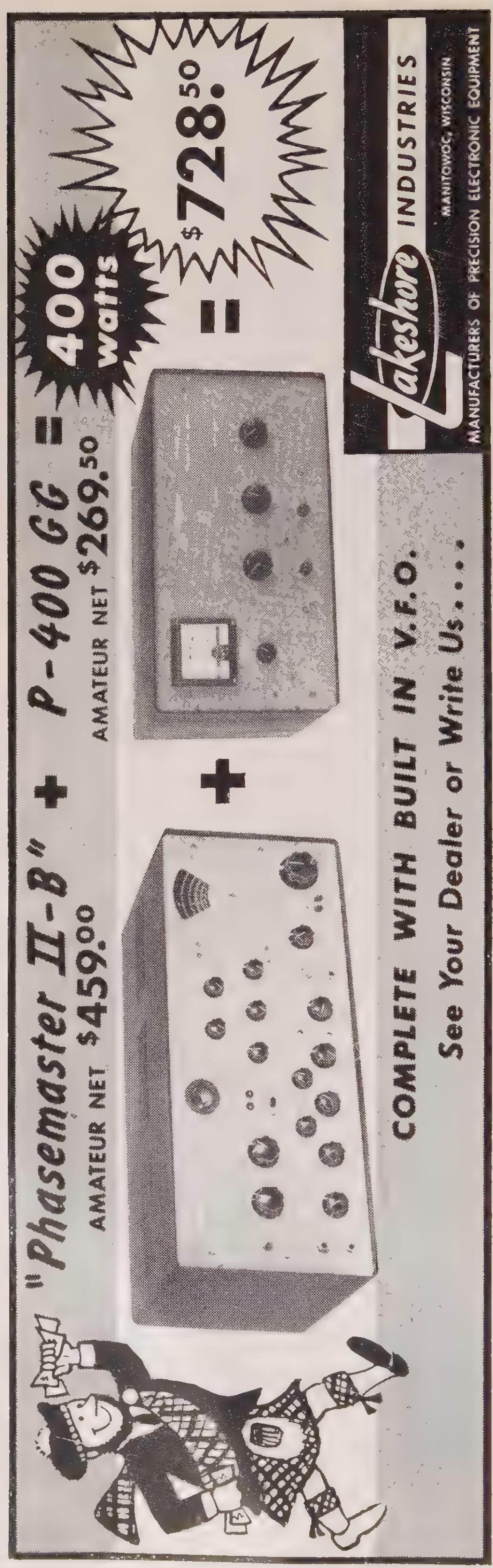

4CX250B


4-125A


4-250A


4CX300A

For further information, check number 7 on page 126.



For further information, check number 8 on page 126.

CLUB BULLETINS

Marvin D. Lipton, VE3DQX
311 Rosemary Road, Toronto 10, Ontario, Canada

Paul F. Montgomery, MARS/Army, A82-HB, of Lewiston, Mich., won a one year subscription to CQ for sending in the best anecdote of the month. Every month an assortment of puns from member papers and submitted by readers is printed on the 4th page of CQ NEWS. If you would like to be eligible for a free CQ subscription, mail your news story, joke, etc., to the QTH above.

CQ NEWS is mailed to Amateur Radio publications located in countries extending from Okinawa in the west to Sweden in the east. One of our remote editors is Dave Wooderson, G3HKX, who is associated with the NEWSLETTER of the North Kent Radio Society of Kent, England. This particular 4 page publication is outstanding because of the manner in which it is written. The periodical, founded by G3ANK, is assembled as a personal letter to each of the 75 members. It is interesting to note that in this paper the editor seldom "talks down" to the membership. Too often editors of club papers on this continent tend to assume an air of superiority, refusing to condescend when addressing their readers. It would be gratifying if more editors adopted an informal approach in their journals in lieu of the professional style that they presently are attempting to imitate.

The news story that seems to have done most for Amateur Radio public relations this month is one that I read about in the SRA BULLETIN. Six members of the Spokane Radio Amateurs Inc., publishers of the SRA BULLETIN, aided the Sheriff's Office of Spokane County, Washington, in an early morning search for a lost child. The Amateur group provided emergency communications, demonstrating once again, the Amateurs' willingness to serve the community in time of need.

Over the past few months some changes have come about in the status of News Service members. Norm Wasson, W6NNV, editor of the So. Calif. DX Club Bulletin has resigned his post because of lack of time. According to a report in the Schenectady A.R. Assn. bulletin, SARA NEWS, New York State Hams will get call letter license plates in 1960 when permanent plates go into effect. RF, RF Propagation Soc. of Canada, printed a similar report stating that Hams in the Canadian Province of Alberta will have the same privilege

[*Continued on page 90*]

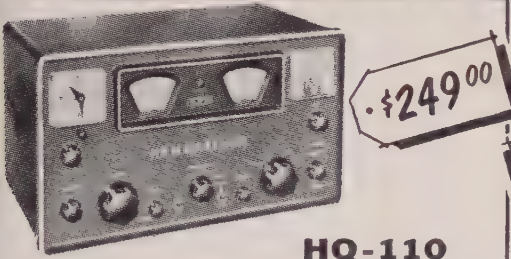
take your choice!

HQ-100

True Hammarlund quality at low cost! General coverage, 540 KCS to 30.0 MCS. 10-tube superheterodyne with automatic noise limiter. Electrical bandspread. Q-multiplier.

Optional Telechron clock-timer $10

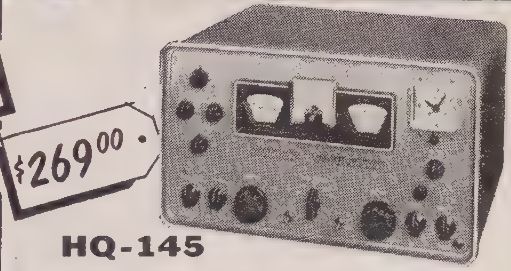
EVERYONE A WINNER!



HQ-110

A true amateur receiver at a low price! Dual conversion. 6, 10, 15, 20, 40, 80 and 160 meter ham bands. Crystal calibrator. Q-multiplier. Separate linear detector for SSB and CW. Separate BFO.

Optional Telechron clock-timer $10



HQ-145

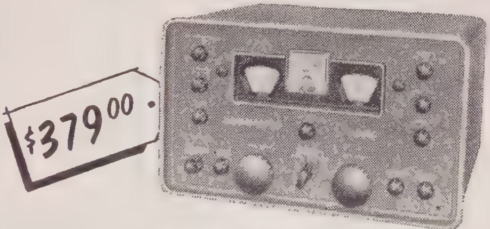
Brand-new general-coverage receiver! 540 KCS to 30.0 MCS. Dual conversion. Adjustable 60 db slot filter. Crystal filter. 11-tube superheterodyne with automatic noise limiter.

Optional Telechron clock-timer $10
Optional plug-in 100 KCS calibrator $15.95

HQ-170

Best for the amateur at any price! Dual and triple conversion 17-tube superheterodyne with automatic noise limiter. 60 db slot filter. Separate vernier tuning. Selectable sideband. Tuned IF amplifier. Crystal calibrator.

Optional Telechron clock-timer $10



HQ-160

Everything you could wish for in general-coverage! 13-tube superheterodyne with automatic noise limiter. Dual conversion. 540 KCS to 31.0 MCS. Crystal calibrator. Electrical bandspread. Slot filter. Q-multiplier.

HAMMARLUND
MANUFACTURING COMPANY, INC.
460 West 34th Street, New York 1, N.Y.
In Canada: White Radio, Ltd., 41 West Ave., N. Hamilton, Ont.

Established 1910

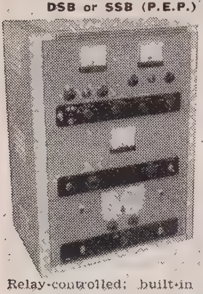
For further information, check number 9 on page 126.

More "WORKABLE WATTS" per dollar from GLOBE electronics

"The World's Fastest Growing Line of Amateur Radio Equipment"

540w AM & CW; 700w max. on DSB or SSB (P.E.P.) Input

Globe King 500C



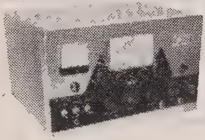
Completely Bandswitching 10-160M

W/T: **$795.00**

Relay-controlled; built-in antenna relay, VFO, commercial type compression circuit. Separate power supply for modulator. Time sequence keying.

350w CW, 275 AM, 450w SSB (P.E.P.) Input

Globe Champion 300A

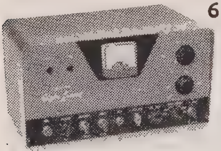


W/T: **$495.00**

Kit: **$399.00**

Bandswitching 10-160. Built-in VFO, Pi-Net output, 48-700 ohms, push-to-talk, antenna changeover relay, time sequence keying, compression circuit. Kit with preassembled VFO.

Plate Modulated . . **Globe Scout 680A**



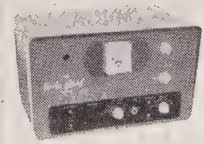
W/T: **$119.95**

Kit: **$99.95**

65w CW
50w AM

Self-contained, bandswitching, 6-80M, with built-in power supply. Pi-Net 10-80M, link-coupled on 6M. High level modulation. Forward Look.

90w CW for 10-160M **Globe Chief 90A**



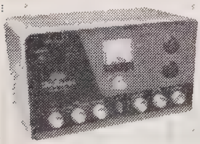
W/T: **$74.50**

Kit: **$59.95**

Forward Look cabinet, bandswitching Xmttr. Built-in power supply. Pi-Net. Provisions for external VFO.

Bandswitching 6 & 2M Xmttr.

Globe Hi-Bander



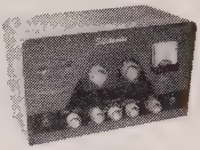
Power Input:
60w CW:
55w AM
on Both
6 & 2M

W/T: **$149.95** Kit: **$129.95**

Regulated screen supply. 4-stage RF section allowing straight through operation. Good harmonic and TVI suppression. RF Stages metered. Provisions for mobile use. 52-72 ohm coax output. New duo-band final tank circuit eliminates switching.

100w PEP DSB Input, Suppressed Carrier 40w AM, 50w CW

Sidebander DSB-100



W/T: **$139.95**

Kit: **$119.95**

Complete transmitter, bandswitching 80-10M. Min. 45db carrier suppression. 3-stage RF section, pi-net; speech clipping. Inverse neg. feedback. Ceramic band and function switches. Narrow bandwidth. Forward Look.

Globe's VOX Model 10

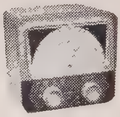
For voice operated control, with extra contacts for auxiliary circuits. Plug in socket at rear of DSB Xmttr. Adaptable for Scout, Champ and similar Xmttrs.

W/T: **$24.95** Kit: **$19.95**

QT-10: Anti-trip accessory for VOX. W/T: **$9.95**

VFO 755A

160-10 Meters

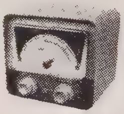


W/T: **$59.95**

Kit: **$49.95**

For 10-160M; output on 40 & 160M. Vernier drive with shock absorbing features. Self-contained, well-filtered power supply with voltage regulation.

VFO 6-2



W/T: **$59.95**

Kit: **$49.95**

Perfect zero beat. Built-in power supply with voltage regulation. Drives 6 & 2M Xmttrs. Temp. compensated. Ideal for Hi-Bander, Sideband stability.

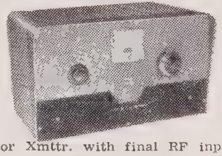
Model 666 for 6M, w/t only, **$49.95**

Power Attenuator PA-1

Use with Xmttrs. up to 70w input; for swamping drive to linear amplifiers. Three power reduction positions. Coax input and output. W/T: **$10.95**

Antenna Tuner with VSWR Bridge

Globe Matcher Sr.



W/T: **$79.50**

Kit: **$69.50**

Shielded Cabinet

For Xmttr. with final RF input up to 600w, 80-10M. Fixed link coupling in output. Coax input, 2-wire balanced output. Monitor SWR between Tuner and Xmttr.

Globe Matcher Jr., AT-3

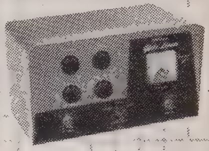
For input to Xmttr. of 100w CW, 75w fone or less. Substantial harmonic attenuation. Unbalanced output. Self contained.

W/T: **$15.95** Kit: **$11.95**

Grounded Grid, Class B or C 6-80 Meters

Globe Linear LA-1

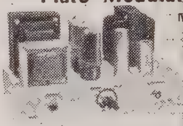
W/T: **$124.50** Kit: **$99.50**



Complete with well-filtered power supply. 200w input AM Class B. 300w DC or 420 PEP input Class B linear SSB or DSB. 300w Class C for CW. Pi-Net 80-10M. 52 ohm Pi-Link coupled on 6M. Extensively TVI-protected.

Versatile Modulator

Plate Modulator UM-1



Modulates RF inputs up to 100w.

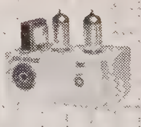
W/T: **$49.95**

Kit (less tubes): **$32.50**

Class A or AB_2 modulator, driver for higher power modulator, PA Amplifier. Matches output impedances 500-20,000 ohms. Carbon or crystal mike usable. Perforated steel cover, $3.00 extra. Supplies 10-45w audio output. Ideal for use with Chief.

Controlled Carrier Type

Screen Modulator Kit



Ideal for use with Globe Chief, Permits radio-telephone operation at small cost. Self-contained. Connections, instructions, printed circuits, etc. supplied.

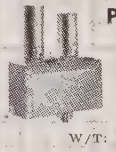
Kit: **$11.95**

6 Meter Converter

Compact, stable, crystal converter for receivers tuning output frequencies 10-14mc. Cascode RF stage, band-pass coupling, shielded input and output, high sensitivity. Crystal for 10-14mc ouput supplied.

W/T: **$27.50** Kit: **$19.95**

Power Booster PB-1



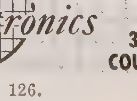
For straight through operation on 6M (plugs internally into Globe Scout): approx. 50% more power output, while attenuating harmonic and further suppressing TVI.

W/T: **$21.95** Kit: **$14.95**

Peak Limiting Pre-Amplifier

Speech Booster FCL-1

W/T: **$24.95** Kit: **$15.95**

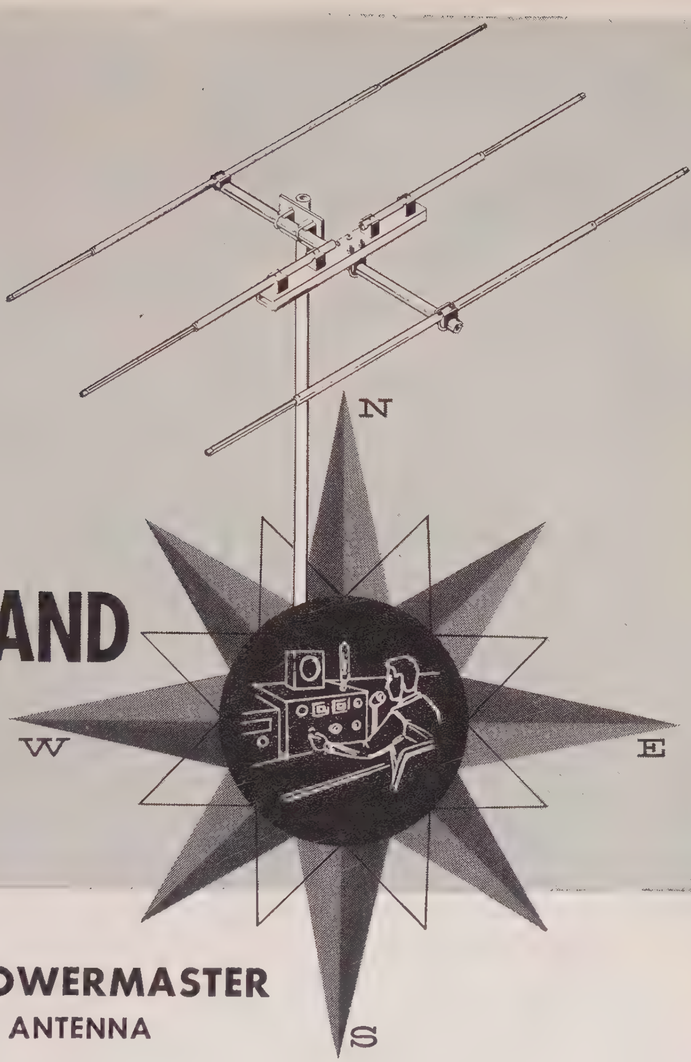


Perfect for Scout, Hi-Bander & other Xmttrs. Clips and filters speech frequencies at pre-set amplitude. Response: 300-3500 cycles. Increases modulation intensity.

See Your Favorite Distributor For the Full Line From GLOBE electronics

3417 W. BROADWAY
COUNCIL BLUFFS, IOWA

For further information, check number 10 on page 126.



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Here's the full-size beam with full-size performance, for the ham who demands the best!

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Mosley TRAPMASTER Line

If your dealer can't supply the POWERMASTER you want, write to

Mosley Electronics, Inc

8622 St. Charles Rock Road
St. Louis 14, Mo.

For further information, check number 11 on page 126.

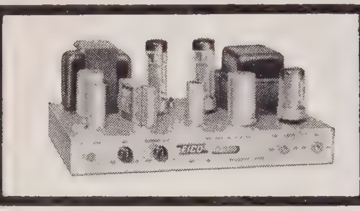
The specs are the proof . . . now your BEST BUY in ham gear is EICO

New

90-WATT CW TRANSMITTER . . #720

KIT $79.95 WIRED $119.95

Conservative, highly efficient design plus stability, safety, and excellent parts quality. 80 thru 40, 20, 15, 11, 10 meters (popular operating bands) with one knob bandswitching. 6146 final amplifier for full "clean" 90 W input, protected by clamper tube. 6CL6 Colpitts oscillator, 6AQ5 clamper, 6AQ5 buffer-multiplier, GZ34 rectifier. "Novice limit" calibration on meter keeps novice inside FCC-required 75W limit. No shock hazard at key. Wide range, hi-efficiency pi-network matches antennas 50-1000 ohms, minimizes harmonics. EXT plate mod. terminals for AM phone modulation with 65W input. Excellent as basic exciter to drive a power amplifier stage to max. allowable input of 1KW. Very effective TVI suppression. Ingenious new "low silhouette" design for complete shielding and "living room" attractiveness. Conservatively rated parts, copper-plated chassis, ceramic switch insulation. 5" H, 15" W, 9½" D.



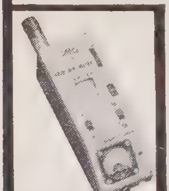
NEW UNIVERSAL MODULATOR-DRIVER #730

KIT $49.95 WIRED $79.95 Cover E-5 $4.50

Superb, truly versatile modulator at low cost. Can deliver 50 W of undistorted audio signal for phone operation, more than sufficient to modulate 100% EICO =720 CW Transmitter or any xmitter whose RF amplifier has plate input power of up to 100W. Multi-match output xmfr matches most loads between 500-10,000 ohms. Unique over-modulation indicator permits easy monitoring, no need for plate meter. Lo-level speech clipping & filtering with peak speech freq. range circuitry. Low distortion feedback circuit, premium quality audio power pentodes, indirectly heated rectifier filament Balance & bias adj. controls. Inputs for xtal or dynamic mikes, phone patch, etc Excellent deluxe driver for high-power class 8 modulation ECC83/12AX7 speech ampl., 6AL5 speech clipper, 6AN8 ampl. driver, 2-EL34/6CA7 power output, EM84 over-mod. indicator, GZ34 rect. Finest quality, conservatively rated parts, copper-plated chassis. 6" H, 14" W, 8" D.

NEW GRID DIP METER . . . . . #710

KIT $29.95 WIRED $49.95 including complete set of coils for full band coverage.



Exceptionally versatile. Basically a VFO with microammeter in grid: determines freq. of other osc. or tuned circuits; sens. control & phone jack facilitate "zero beat" listening. Excellent absorption wave meter. Ham uses: pretuning & neutralizing xmitters, power indication, locating parasitic osc., antenna adj., correcting TVI, de-bugging with xmitter power off, determining C,L,Q. Servicing uses: alignment of filters, IF's; as sig. or marker gen. Easy to hold & thumb-tune with 1 hand. Continuous 400 kc—250 mc coverage in 7 ranges, pre-wound 0.5% accurate coils 500 ua meter movement. 6AF4(A) or 6T4 Colpitts osc Xmfr-operated sel. rect. 2¼" H, 2$\frac{9}{16}$" W, 6⅞" L. Satin deep-etched aluminum panel; grey wrinkle steel case.

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Bellerose, New York

Physical Qualifications, Characters and Personalities (if their names were indicative!)

W7AZP is Little, W3ISW is Large, W3KDI is Small, W7BCU is Short but W3EGN is Shorter. W2UZM and VE3FS are Strong and Sturdy. W0SFQ is Stout, W0BJA is Gaunt and DL2XY is Slim but W9HEA is Slimmer!

K9AFP and W2VCU are Hale and Hardy

ZL3DT and ZL2LL are Rough and Ready.

K4HZL is Keen, W8ASF is Sharp, K4HLR is Bright, W2UQQ is Smart, W2BFN is Witty and W3AIZ is Wise but W3NYL is Wiser! W2OWT is Quick, DL1EF is Fast, W0ORC is Speedy, W1FDJ is Swift, W3KXH and W9OOL are Spry and Lively.

W8VQM is Bold and G4AV is Forward while W9EUO is Meek but W2GDN is Meeker. W8TOG is Humble, W2GCO is Good, DL7DL is Loyal and DL2XI is Faithful. W0AUT is Loving, W0KYM is Kind, W3KYI is Fine, W2AMG is Gallant, K9KHR and W0QZR are Sweet and Gentle. W1CIC is Frank, W9ZMG is Just and W0ZTI is True. W3DBX and W3WBQ are Proud and Famous.

W2JU is Stern but W2GQK is Sterner while W0QMQ is Jolly and K6ACC is Gay. W2KWI is Petty and K2KWJ is Cross but W2DSU is Merry, W8AAH is Happy and W9UDZ is Pleasant. VE6EY is Careless but VK5ZAK is Tidy. W9ITE is Lovely, ZS5HT is Dainty,—but G3BJB is a Dandy! W9PRU and W1ATC are Neat and Trim while W3CFG and K2COB are Prim and Sporty.

W1OST is Steady. VE3OV is Rash and W2DOF is Wild but W2ZCZ is Wilder. W0BIM is Sly. W3WBH is Queer, W5ITD is Strange but K2PTN is Friendly. W2LLO is Hard but W9NHW is Harder. W8ZVO and W0SEM are Grim and Moody.

W0UCV is a Dear, W1AGL is a Darling, W1EHZ is certainly a Comfort but W0EHQ is a Brute.

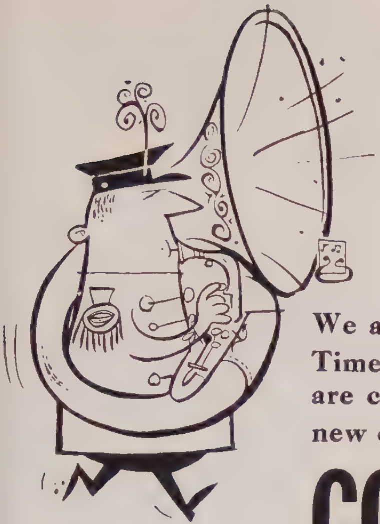
ZS5BN is Perfect.
KN4EXN is a Marvel.
W8WUU and W8WUT are Miracles.
Want a Surprise .... K6HKT.
Want a Shock .... W0JWF.
Want a Job .... VE3WO.

You'll get a Kick out of looking up K2JTJ.

Attention YLs:

W4VJZ is Close, but W1HD is a Spender.

W8QFO is a Honey but W4NVH is a Doll! and, for a Kiss or a Hug, try W2REZ or W5CFQ. ■



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We are sure proud of the Frequency Stability vs. Time tests on a few typical COSMOPHONE "35"s. Here are curves of a few typical units to better acquaint new owners with the Frequency Stability of the new

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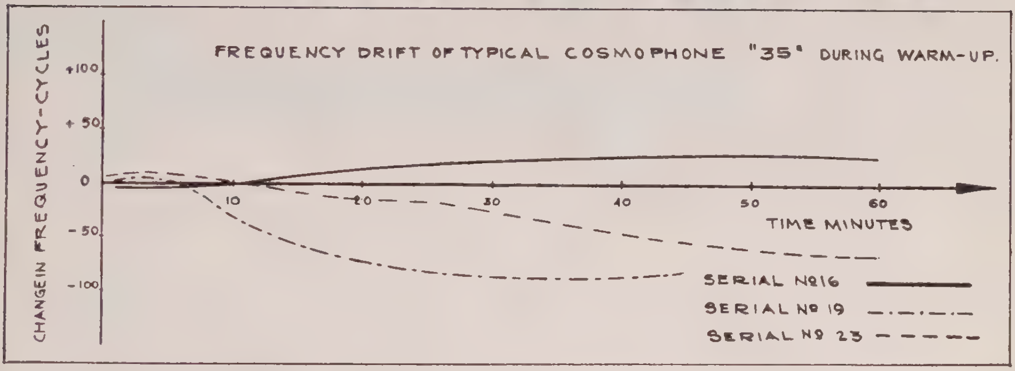

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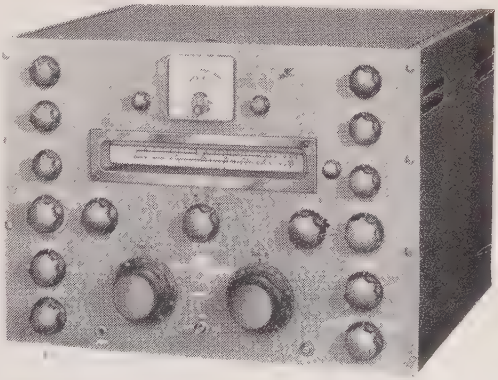

- Operates on 10, 11, 15, 20, 40 and 80 meter bands.
- Transmits or receives SSB (upper or lower), single sideband with carrier (AM) or C.W.
- Peak-Null "Q" Multiplier.
- Receiver Sensitivity. 1 Micro-volt @ 6 db S/N ratio.
- Single 6146 output.
- Built-in VOX and QT.
- 40 db suppression.
- Meter Indication for R.F. output, final Grid or Plate current and receiver signal strength.
- Dimensions 17" wide x 12" high x 15" deep.
- 3.1 kc mechanical filter for transmission and reception.
- Dual speed tuning knobs with ratios of 20:1 and 100:1 over a 600 kc band spread.

Power Supply #P35

Amateur Net Price $799.50 **$139.50**

immediate delivery at your dealer

for additional information and dealer nearest you, write Dept. CQ 1

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GSB-100

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SSB

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SSB LINEAR AMPLIFIER

GSB-100 Transmitter

POWER INPUT...140 watts P.E.P. sufficient for use as a complete transmitter, more than enough as an exciter.

SSB WITH SELECTABLE SIDEBANDS: AM, PM or C.W. Keying characteristics are excellent.

TRANSMITS BOTH SIDEBANDS WHEN ON AM.

EXCLUSIVE FILTER PHASING SYSTEM ...contributes materially to SSB quality. Unwanted sideband suppression 45 db. Uses quartz crystal CARRIER - ELIMINATION filter to suppress carrier by more than 60 db, avoids need for adjustments on carrier balance and sideband suppression.

FREQUENCY CONTROL by fixed, quartz crystal and exceptionally stable VFO. Complete band coverage with 5 kc calibration and interpolation to better than 1 kc. Precision gear ratio dial drive.

EXCELLENT VOICE OPERATED CONTROL SYSTEM (VOX). Biasing voltage available for cutoff of external linear amplifier when receiving.

COVERS 80-40-20-15-10 METERS. Flexible pi network output, quick band change. All operating controls on front panel.

BUILT IN, HEAVY - DUTY AC POWER SUPPLY.

Model #3233... **479.50**

GSB-101 Linear Amplifier

POWER INPUT: 1200 watts P.E.P. Grounded grid principle is utilized, does not waste drive power by swamping exciter...drive appears in output of final.

DRIVING POWER REQUIRED: 70 to 80 watts, readily supplied by GSB-100 or similar SSB transmitter in 100 watt class.

COVERS 80-40-20-15-10 meters.

FULL BANDSWITCHING OPERATION.

PI NETWORK OUTPUT. Flexible, easily loaded.

COMPLETE: Built-in power and bias supplies. Built-in antenna relay, 4—811A tubes and 2—866A rectifiers. Ready to operate.

Same size cabinet and general appearance as GSB-100 transmitter.

Model #3262... **439.50**

For further information, check number 15 on page 126.

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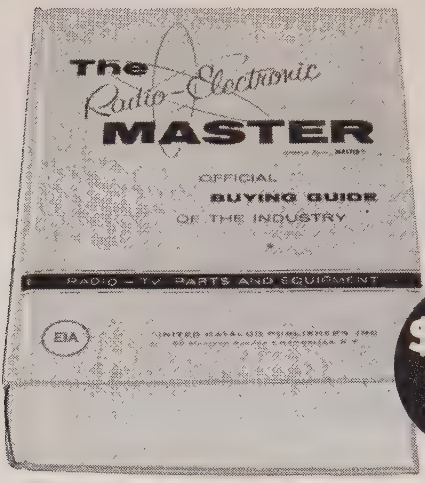
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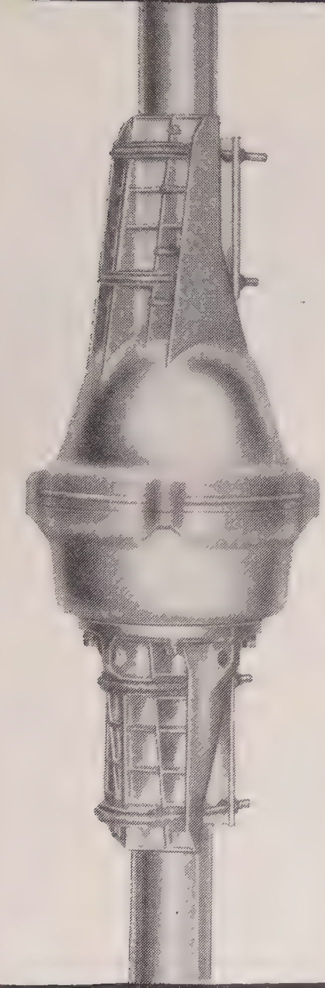

Preferred because:

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Holds heaviest commercial arrays —
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Provides 3500 in.-lb. resistance to lateral thrust.

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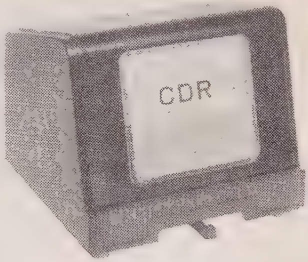

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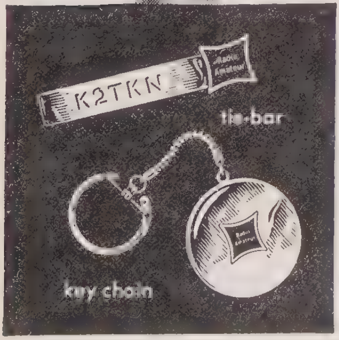

EXCLUSIVE OFFER: CDR "CALL-LETTERS" JEWELRY FREE! Handsome rhodium-finish tie-bar and key chain, both with your call-letters engraved FREE with your purchase of the "HAM-M". Both bear amateur radio emblem. Just *examine* the "HAM-M" and get both for only $3.60 (tax included) a $7.20 value for half price. See your CDR distributor for details.

CDR

HAM ANTENNA ROTOR

Cornell-Dubilier Electric Corp.,
South Plainfield, N. J.

The Radiart Corporation,
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For further information, check number 17 on page 126.

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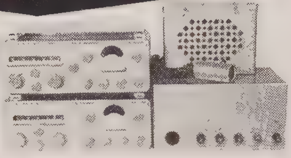

Complete mobile station, consisting of the MB-6 Receiver, MB-565 Transmitter, RTV 630 12-volt DC Power Supply, MK-N1 Microphone, SH-7 Speaker, Jiffy Mounts, and Interconnecting Cables. Connect to your battery and antenna and go mobile—push-to-talk, no relays to buy.

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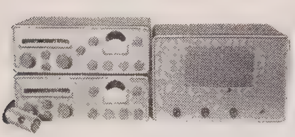

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15-Day Home Trial will convince you that you have really made a deal! You must be satisfied or your money back!

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10% down on approved credit; up to 24 months on the balance. No carrying charge if paid in full within 90 days.

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☐ Check ☐ Money Order enclosed for sum of $ ____________
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For further information, check number 18 on page 126.

MARS BROADCASTS

Air Force MARS Eastern Technical Net

Sundays at 2-4 PM EST—3295 KC, 7540 KC, 15,715 KC.

Jan. 4—Tech Net Vacation Day.

Jan. 11—Capacitors. Mr. Rod Simon, Airborn Instruments Laboratories.

Jan. 18—Radio in Antarctica. Fr. Daniel Linehan, Geophysics Laboratory, Boston College.

Jan. 25—Electronics and the Patent Law. Mr. S. C. Yuter.

Air Force MARS Western Technical Net

Sundays 2-4 PM PST—7832.5 KC, 3295 KC, 143.6 MC.

Jan. 4—Kaiser-Aiken Thin Cathode Ray Tube by Mr. William Ross Aiken Kaiser Aeronautics & Electronics

Jan. 11—Kaiser Flitepath System by Engineering Staff, Kaiser Aeronautics & Electronics

Jan. 18—Transmitters Powered By Solar Energy by Major Gilbert, Hoffman Electronics Corp.

Jan. 25—Design Of Missile Support Equipment by Tapco Group, Division of Thompson-Ramo-Woolridge Corp.

First Army MARS SSB Technical Net

Wednesday evening at 9 PM, EST, on 4030 KC upper sideband:

Jan. 7— The Modern Approach to Front End Receiver Design by Marvin M. Klein, Manager Engineering, Research and Development, Lewyt Mfg. Corp.

Jan. 14—Track—Morse Code to Teleprinter Converter by Thomas Waldron, Group Leader, Information Conversion Group, CGS Laboratories.

Jan. 21—Phone Patches by Robert W. Gunderson, Editor Braille Technical Press.

Jan. 28—Measurement of Nuclear and X-Ray Radiation by William Minowitz, Physicist, Nuclear Products Division, Amperex Electronics Corp.

New MORADCO

SINGLE SIDEBAND
MINIATURIZED 50 WATT
TRANSMITTER
4⅛" x 11-⅞" x 7¼"

Model SBT for *Fixed* or *Mobile* Use

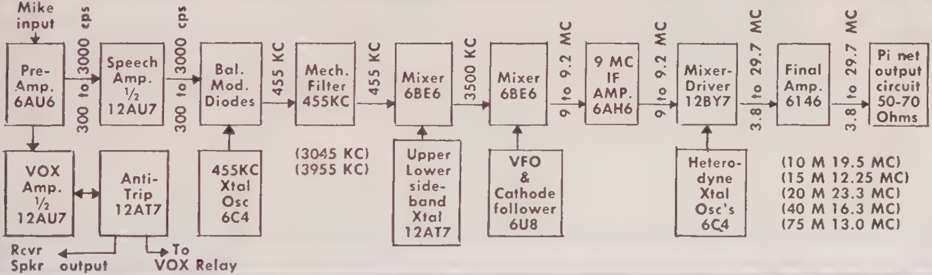
Coverage: 3.8-4.0, 7.1-7.3, 14.1-14.3, 21.200-21.400, 28.5-28.7 MC.

Calibration: VFO Calibrated, 0-200 Kc (add to frequency shown on band switch).

Filter: Uses a Mechanical Filter for Long Term Maximum Suppression of Unwanted Sideband.

Emission: Upper or Lower Sideband. CW-AM (SSB with Carrier Added).

STREAMLINE DESIGN *PROVES* MONTHS OF MORROW RESEARCH



- Change bands, set drive and peak final, null carrier in about 30 seconds.
- Excellent voice-operated control system (VOX). Anti-trip of new, improved design, plus push-to-talk.
- Semi-automatic loading when changing bands —designed for 50-70 ohms.
- Antenna (VOX) relay built in.
- By changing plugs in the universal power supply unit, the SBT operates as an exciter at about 10 watts output, or as a barefoot transmitter at about 50 watts output.
- Controls grouped for ease of operation.
- Same cabinet dimensions as MB6 and MB565: 4⅛" x 11⅞" x 7¼".
- Plug-in connections for easy removal from car.

NEW

12-Volt DC, 115-Volt AC, Universal Power Supply Unit designed especially for the SBT Transmitter includes complete set of power cables for either home or mobile use.

Amateur net................**$124.50**

AVAILABLE IN FEBRUARY, 1959......NET $349.50

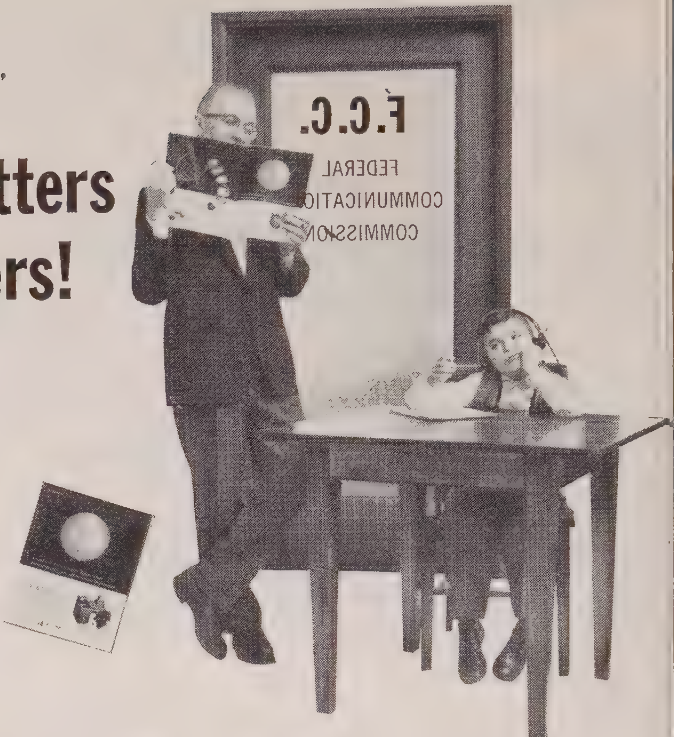
FOR FURTHER INFORMATION on the SBT Transmitter, see your dealer or write to:

MORROW radio manufacturing company
P. O. Box 1627 Salem, Oregon

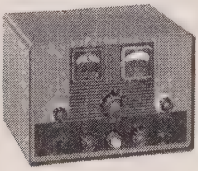
For further information, check number 19 on page 126.

NOVICE OR EXPERIENCED AMATEUR . . .
THEY'LL ALL TELL YOU . . .

Viking transmitters outsell all others!



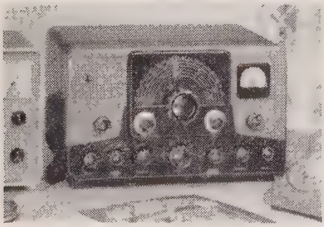
Yes, dollar-for-dollar and feature-for-feature you'll get more of everything in a Viking transmitter . . . that's why Viking transmitters outsell all others! Write for your free Viking Amateur Catalog and you'll soon see why your best transmitter buy is a Viking!



"CHALLENGER" TRANSMITTER

Ideal for fixed station, portable or field day use, the "Challenger" is designed for fast, easy tuning, excellent stability and plenty of reserve drive. 70 watts phone input 80 through 6; 120 watts CW input 80 through 10 . . . 85 watts CW input on 6 meters. Wide-range pi-network output—effectively TVI suppressed—excellent keying system. For crystal or external VFO control. With tubes.

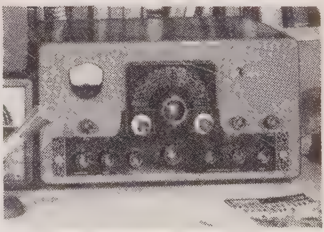
Cat. No.	Amateur Net
240-182-1 . . Kit	$114.75
240-182-2 . . Wired	$154.75



"RANGER" TRANSMITTER/EXCITER

This popular, superbly engineered transmitter also serves as an RF/audio exciter for high power equipment. 75 watts CW or 65 watts phone input. Built-in VFO or crystal control—instant bandswitching 160 through 10. 6146 final amplifier—wide range pi-network output. Timed sequence keying. TVI suppressed. With tubes, less crystals.

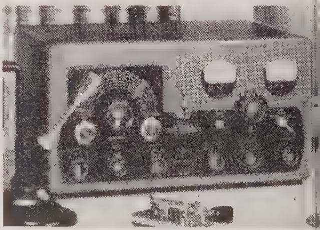
Cat. No.	Amateur Net
240-161-1 . . Kit	$229.50
240-161-2 . . Wired and tested	$329.50



"VALIANT" TRANSMITTER

Here's effective power, wide flexibility, and many unique operating features combined in a compact desk-top transmitter! 275 watts input CW and SSB (P.E.P. with auxiliary SSB exciter) and 200 watts phone. Bandswitching 160 through 10. Built-in VFO or crystal control. Final amplifier utilizes three 6146 tubes in parallel—wide range pi-network output. With tubes, less crystals.

Cat. No.	Amateur Net
240-104-1 . . Kit	$349.50
240-104-2 . . Wired and tested	$439.50



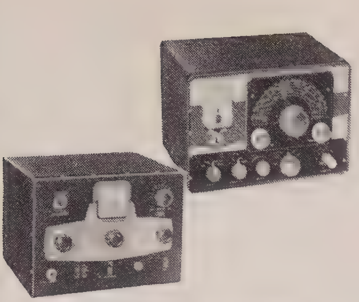
"FIVE HUNDRED" TRANSMITTER

More than one-half kilowatt of pow
and operating convenience! 600 wat
CW input . . . 500 watts phone an
SSB (P.E.P. with auxiliary SSB exci
er)—instant bandswitching 80 throug
10 meters! All exciter stages gange
to VFO tuning. High gain push-to-ta
audio system. Highly stable, built-i
VFO or crystal control. Wide rang
pi-network output. Low level audi
clipping—effectively TVI suppresse
With tubes, less crystals.

Cat. No.	Amateur N
240-500-1 . . Kit	$749.5
240-500-2 . . Wired	$949.5

E. F. JOHNSON COMPANY

2801 SECOND AVENUE S.W



"NAVIGATOR" TRANSMITTER/EXCITER

More than a novice transmitter—serves as a flexible VFO-Exciter with enough RF power to excite most high powered amplifiers on CW and AM! 40 watts CW input—6146 final amplifier tube—wide range pi-network output. Built-in VFO or crystal control—bandswitching 160 through 10. Timed sequence keying. TVI suppressed. With tubes, less crystals.

Cat. No.	Amateur Net
240-126-1..Kit	**$149.50**
240-126-2..Wired and tested	**$199.50**

"ADVENTURER" TRANSMITTER

Perfect for novice or experienced amateur! 50 watts CW input—instant bandswitching 80 through 10 meters. Crystal or external VFO control. With tubes, less crystals.

Cat. No.	Amateur Net
240-181-1..Kit	**$54.95**

"6N2" TRANSMITTER

Punches your signal out with 150 watts CW and 100 watts phone input. Bandswitching 6 and 2 meters. TVI suppressed. May be used with Viking "Ranger" or similar power supply/modulator combination. Crystal control or external VFO with 8-9 output. With tubes.

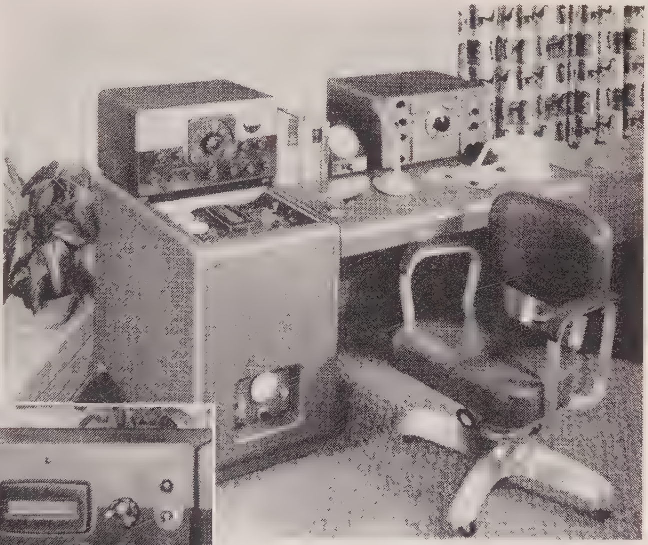
Cat. No.	Amateur Net
240-201-1..Kit	**$129.50**
240-201-2..Wired	**$169.50**

"KILOWATT" AMPLIFIER

Here's the most exciting unit you've ever seen . . . the unit that puts the whole world at your fingertips! Brilliantly designed and engineered, the Viking "Kilowatt" is the only power amplifier available which will deliver full 2000 watts SSB* input and 1000 watts CW and AM! Continuous coverage 3.5 to 30 mc. Excitation requirements: 30 watts RF and 10 watts audio for AM; 10 watts peak for SSB.

Cat. No.	Amateur Net
240-1000..Wired and tested	**$1595.00**
251-101-1..Matching desk top, back and 3 drawer pedestal..FOB Corry, Pa...	**$132.00**

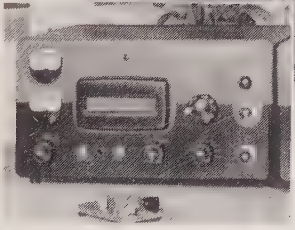
**The FCC permits a maximum of one kilowatt average power input for the amateur service. In SSB operation under normal conditions this results in peak envelope power inputs of 2000 watts or more depending upon individual voice characteristics.*



OURIER" AMPLIFIER

is power-packed Class B linear plifier is rated 500 watts P.E.P. ut with aux. SSB exciter—500 tts CW and 200 watts AM! Conuous coverage 3.5 to 30 mcs. y be driven by the Viking anger", "Pacemaker" or other t of comparable output. Drive uirements: 5 to 35 watts. Emys two 811A triodes in parallel ide range pi-network. TVI supssed. With tubes.

. No.	Amateur Net
-352-1..Kit	**$244.50**
-352-2..Wired	**$289.50**



"THUNDERBOLT" AMPLIFIER

Here's real power and peak performance in a compact desk-top amplifier. Rated 2000 watts P.E.P.* input SSB; 1000 watts CW; 800 watts AM linear! Continuous coverage 3.5 to 30 mcs.—instant bandswitching. May be driven by the "Ranger", "Pacemaker" or other unit of comparable output. Two 4-400A tetrodes in parallel, bridge neutralized. Wide range pi-network output. With tubes.

Cat. No.	Amateur Net
240-353-1..Kit	**$524.50**
240-353-2..Wired	**$589.50**

"PACEMAKER" TRANSMITTER/EXCITER

An outstanding power bargain when used as a transmitter or exciter! 90 watts SSB P.E.P. and CW input . . . 35 watts AM. Highly stable built-in VFO. Instant bandswitching 80, 40, 20, 15 and 10 meters. VOX and anti-trip circuits. Wide range pi-network output. Effectively TVI suppressed. With tubes and crystals.

Cat. No.	Amateur Net
240-301-2..Wired	**$495.00**

Viking

FIRST CHOICE AMONG THE NATION'S AMATEURS

SECA, MINNESOTA

For further information, check number 20 on page 126.

813's—1959 Version

Gordon E. Hopper, W1ME
75 Kendall Ave.
Framingham, Mass.

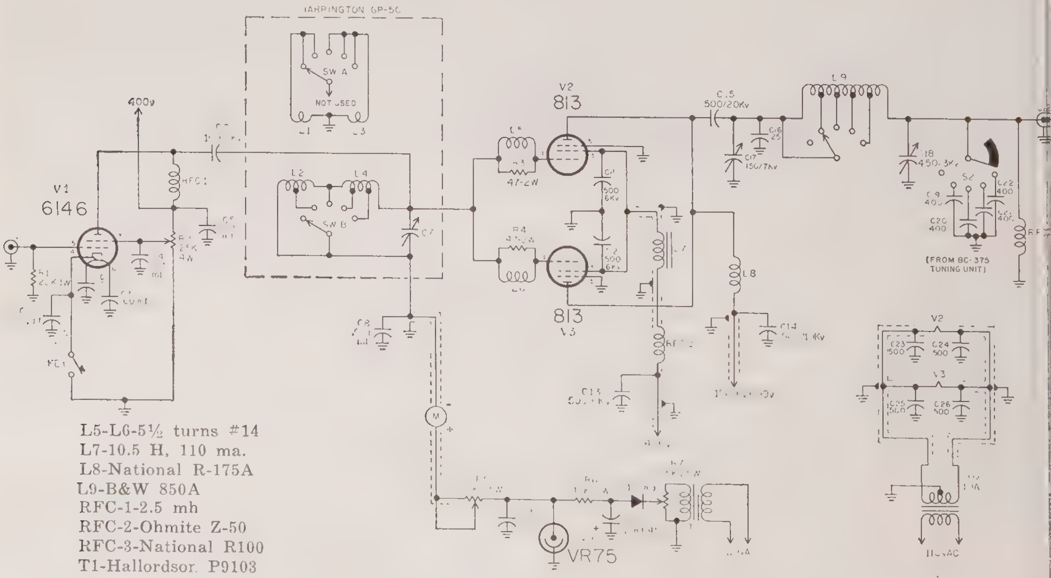
After many years of operating transmitters running 120 watts and less, the time came when the desire to have a bigger signal led to the investigation of something that would deliver 500-600 watts without straining the budget too much. The old standby 813 tube seems to still be readily available at prices that compare with 6146 tube prices. This writer picked his up at a club auction for one buck apiece and horsetraded for a spare pair.

After studying several articles and various manufacturers' literature it was decided to use a pair of 813's in parallel to obtain a real cool half gallon. Because an all-band trap antenna is in use it was decided to use a pi-net output and to load the trap antenna with a home brew 500 watt antenna coupler built from an article in the 1957 and 1958 ARRL Handbook.

This particular transmitter starts out with a commercial built VFO unit, feeding into a 6146 driver stage, which in turn drives the grids of the 813's. The driver stage is conventiona circuitry, capacity coupled to the final grid with a Harrington Electronics GP-50 unit i the final grid circuit.

A variable drive control is incorporated a a potentiometer in the screen grid of the 6146 The 813 grids are wired parallel as are th plates to accommodate the pi-net. Home-mad suppressors are used in the control grids bu Ohmite P-300 units could be used. Keying i accomplished in the 6146 cathode. The Harrington tuner can be tuned by a vernier kno taken from a war surplus BC-375 but is no absolutely necessary. The fixed loading condensers in the pi-output are taken from a BC 375 tuning unit. The pi-net unit is a B&W 850A and the plate choke is a National R-175A.

By using modern components like the Harrington tuner, which is a very efficient unit and the B&W pi-net, the transmitter will work on all bands with no effort, will eliminat



L5-L6-5½ turns #14
L7-10.5 H, 110 ma.
L8-National R-175A
L9-B&W 850A
RFC-1-2.5 mh
RFC-2-Ohmite Z-50
RFC-3-National R100
T1-Hallordsor P9103

Fig. 1—Gordon's version of a modern final using 813's.

shock hazard of changing coils and all band changing can be done by front panel controls.

One power supply is used for the driver stage plate and screen and the same supply is relay controlled to operate the 813 screens. A regulated selenium supply with a series bias resistor is used for 813 grid bias.

Construction

Mechanically, the final amplifier was built on two four-inch deep chassis which carry the driver stage, the bias supply, the two large variable condensers, two three-inch meters, the Harrington grid tuner unit and the 813 filament transformer. The pi-net unit is mounted on a one-inch deep chassis and all three chassis are bonded together and mounted on an 8¾″ panel. All screen, filament, and control grid leads are shielded. Neutralization of the 813's was found not to be necessary.

Separate variacs are used in the final power supply and the modulator power supply, along with variable bias to enable this transmitter to operate in the MARS nets at reduced power levels.

If a modulator is to be used and the entire unit assembled into a large cabinet as the author did, the handles from BC-375 tuning units can be installed on each panel to dress it up. This will also facilitate the removal of each panel and attached chassis. This particular final is modulated by a pair of 805 tubes which are driven by the 20 watt speech amplifier described in the 1953 ARRL Handbook.

Looking at the front top-view of the final, the pi-net is mounted near the center, the large variable condenser at the left of the pi-net is the tank tuning and the large variable condenser to the right of the pi-net is the antenna loading. The 813 filament transformer is behind this variable condenser. The 813's are submounted behind the tank tuning condenser. The two clips mounted on stand-off insulators in front of the left-hand 813 tube hold a 50 mmfd vacuum condenser which is plugged in parallel with the tank tuning condenser to facilitate operation on the MARS two and three megacycle frequencies. The shielded compartment at the front left corner houses the 6146 driver, the key jack and the drive control. The left-hand meter is the 0-1000 ma. plate current meter and the right-hand meter is the 0-50 ma. grid current meter.

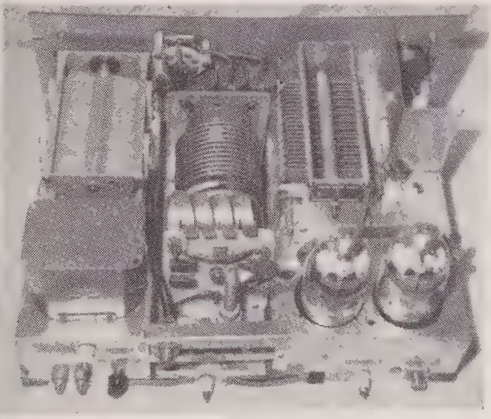
In the rear top-view of the final you can see the National R-175A choke mounted directly behind the pi-net and C-15 is mounted directly on the back of the pi-net. The four 400 mmf fixed antenna loading condensers are seen mounted on an aluminum angle strip mounted between the front panel and the pi-net. The selector switch is a modified surplus unit but a Centralab P-1S can be used successfully.

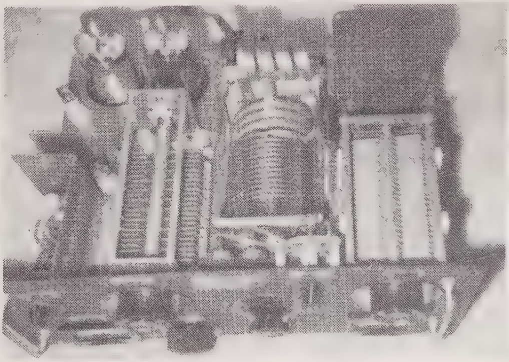
On the rear deck, the right-hand coax connector is the rf input, while the feed-thru insulator next to it is the low-voltage input point. The connector next to the insulator on the left is for bringing 110 volts ac to the 813's screen grid voltage relay. Two other terminals on the same connector go to the 813's screen current meter. The feed-thru insulator in the center brings in the high voltage and the coax connector near the center goes to the antenna coupler. The feed-thru insulator at the top left is used to measure the grid voltage. Two hi-pass condensers below this are in the filament transformer ac line. The knob near the left is on the grid bias control.

With 2000 volts on the final plates, 400 volts on the screens and about 450 volts on the driver, the final plate will draw about 300 ma., the screens about 60 ma., the control grids about 20 ma. (using the driver screen pot to hold this down). The control grid runs 150-175 volts negative. And there you have it, a real cool half-gallon.

In modernizing the 813 circuitry for today's use, modern units like the B&W 850A pi-net and the Harrington grid unit will help the transmitter's efficiency and will make for easier tune-up. Ease of antenna tuning can be realized with the new ARRL 500-watt all-band antenna tuner in conjunction with a Micro-Match standing-wave bridge.

You may have had a pair of 813's in the final ten or twelve years ago, but now try a pair of 813's in the final, *1959 version.* ■





Speech Clipping for AM - - - Why and How

Henry Cross*, W1OOP; George Gadbois, W1U1Z/W3FEY; and Wayne Taft*, W1WID**

During the past few years, amateur circles have devoted a great deal of time to discussing the relative advantages and disadvantages of the various types of emissions in use on the amateur bands. Any single-sideband man will tell you that SSB will put a signal through where nothing else will. Of course, as any communications theory man will tell you, FM (of the narrow sort) will give a better signal-to-noise ratio than AM when used with the proper receiver. However, any ham who has used these systems will tell you that these theoretical advantages are not much help against the practical disadvantage of the other fellow's receiver. For many types of operation (sweepstakes, VHF, talking to old fogeys, and the like), the smart approach seems to mean using the kind of signal that works best with commonly available receivers; that is—AM. Although SSB seems to be the coming thing on the VHF bands, right now it is also desirable to put out a top-effectiveness AM signal on any band, as long as it is legal. On VHF, where the authors spend most of their time, fewer than a third of the stations could receive SSB at present if they wanted to.

If AM is still desirable, the questions of what qualities are desirable in a good AM signal comes up. First, the *average* percentage modulation should be as close to the modulation capabilities of the transmitter as possible to insure "getting through" when conditions are marginal. The second desirable feature concerns the signal bandwidth. The bandwidth of the signal should, of course, be kept as low as practical to avoid interference, commonly known as splatter, to the fellow on the next channel. Because the bandwidth is proportional to the modulating frequency, the high frequency components of the modulation ought to be filtered out. There is a practical limit to filtering, however, because the intelligibility of the signal will suffer if too many of the "highs" are eliminated. Tests have shown that a definite improvement results from passing frequencies up to 3500 cycles, rather than cutting off sharply at some lower frequency. For this reason, it is probably best to follow telephone company practice, and pass approximately 300 to 3000 cycles without attenuation, rolling off at the ends at such a rate that the useful-response range is 200 to 3600 or 4000 cycles. Frequencies below 200 cycles contribute little to intelligibility.

Several methods have been devised for keeping the average modulation high. Most of them fall into either of two categories:

1. Compressors and peak limiting amplifiers
2. Clippers

In amateur practice, the clipper is more desirable because it has fewer parts and is simpler than a compressor, and because it is instantaneous in action, neither an explosive "P" nor a tipped-over mike will cause overmodulation. The main advantage of the compressor over the clipper is lower distortion, which, while of use to the broadcast industry, has no practical value for the ham. The action of the clipper is such that the random peaks common in speech, which usually overmodulate a transmitter when the modulation is set a bit too high, are "clipped off." The resulting square waves will not overmodulate and the average level may be increased. The distortion present when a clipper is used, is caused by the high-order audio harmonics present as a result of the square waves. These audio harmonics may be filtered out after the clipper and the resulting signal is quite readable. For the classical paper on speech clipping, the reader is referred to Licklider and Pollack, in the Journal of the Acoustic Society of America, January, 1948. The basis is empirical, but the tests made were careful and complete enough to prove what can be done.

To obtain the second quality desired, a restricted bandwidth, some type of filter is necessary. The low frequencies may be "rolled off" by using undersized coupling capacitors. For "rolling off" the high frequencies a low-pass filter is required. If used after the clipper, this filter will also eliminate the undesirable audio harmonics generated in the clipper. Note that even though very few audio harmonics are present when compression is used, the *filter s still necessary* in order to limit the bandwidth. Because any audio stages after the filter could add distortion and, therefore, audio harmonics and the resulting "splatter," it might eem desirable to place the filter at the output of the modulator. This consideration is the principle behind the high-level "splatter filters" commonly in use. The components of such a ilter, however, must be able to stand the high voltage and current levels in the output of the modulator. For moderate- to high-powered ransmitters, a better approach would be to put the low-pass filter in a low-level stage smaller and cheaper components required), nd use low-distortion audio amplifiers after he filter. The authors have found that a low-evel filter consisting of one LC section and one RC section will provide adequate attenuation for frequencies higher than 4000 cycles.

---

*National Company, Malden, Mass.

**Electron Tube Division, Radio Corporation of America, Lancaster, Penna.

It may be seen, then, that the use of a clipper-filter modulator yields the desired qualities f a higher average voice level at all times, nd a limited bandwidth. With proper adjustment, there is absolute protection against the ype of splatter that comes from overmodulaion, and there is no danger of forgetting. By eeping the average voice level modulating the ansmitter right up where it can be read loud nd clear, this modulator makes a hundred-watt ham transmitter the equal of a broadcast-yle kilowatt.

Further, careful design and, again, proper djustment of the equipment, will produce a ignal which can be read as well as unclipped peech under the best conditions, and better rough interference or noise, and which will ound natural and have "personality." You get ore decibels-per-dollar improvement than with ny other modification to a conventional system. The only reason clipping doesn't make signals stand out more these days is that many hams already clip without knowing it!

Using the principles described, several modulator circuits were tried by the authors. The results can be summarized in a description of two practical modulators, both using the same clipper-filter circuit. Incidentally, the clipper-filter circuit shown would be a worthwhile addition to a narrow-band FM transmitter, but that is another story.

The Basic Clipper-Filter Circuit

The basic speech amplifier and clipper-filter circuit used in the modulators is shown in fig. 1. Because it is desirable to have good low-frequency response in any amplifier following the clipper to prevent overshoot (sagging tops on the square waves), any low-frequency roll-off must be accomplished in stages preceding the clipper. In this speech amplifier, the low-frequency roll-off is obtained by using low-value coupling capacitors. The clipper circuit employed is a cathode-coupled type using a twin triode. It was chosen because of circuit simplicity and ease of adjustment. An additional feature of this type of clipper is the visual monitoring that can be provided by a milliammeter inserted in the cathode return. This meter will read steady until clipping begins, at which point it kicks up rather like the plate current of a class B modulator.

The filter following the clipper has about 28 DB attenuation at 9 kc, but "building-out" capacitors shunting the modulation transformer, or a high-level filter, may be added to further attenuate audio harmonics present in the modulator output if necessary. (See "Suppressing Audio Harmonics," ARRL Handbook—1957 P. 268.) There is likely to be at least a one- or two-percent distortion added because of im-

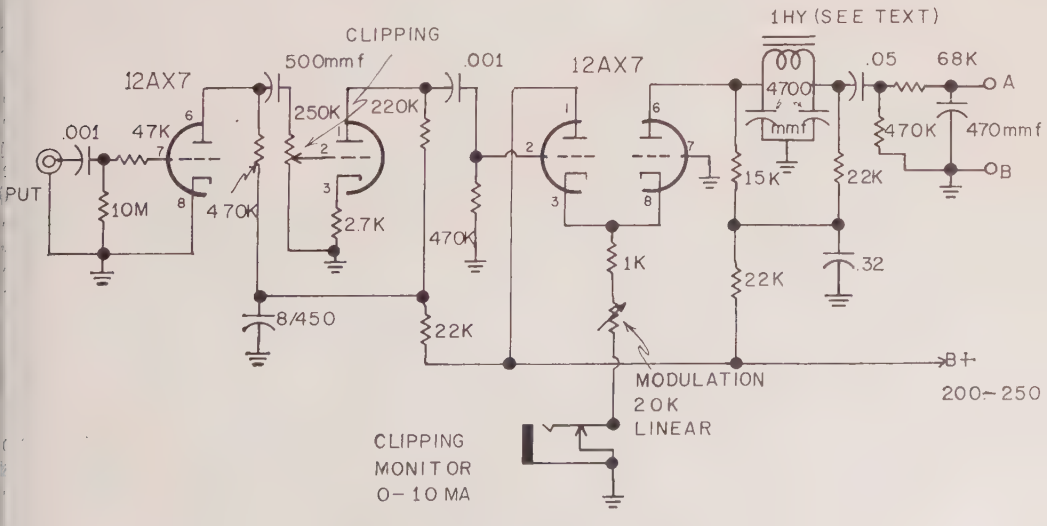


Figure 1. Clipper-Filter Speech Amplifier.

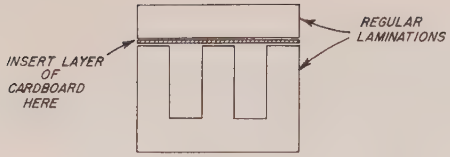
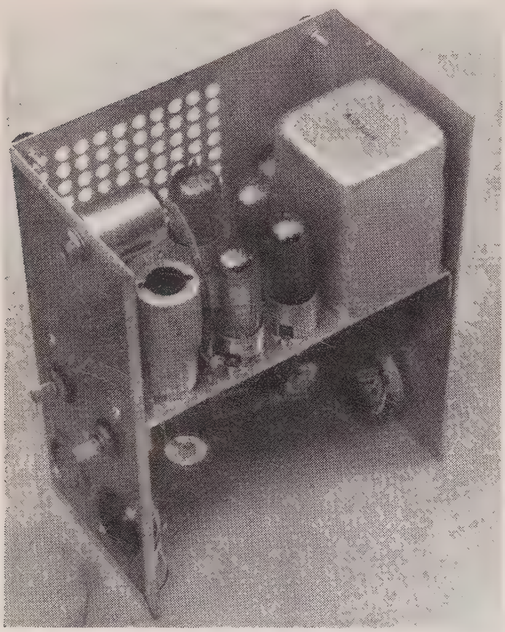


Figure 2. Modification of 50L6 Output Transformer to Make 1-hy Choke.



Top View of 10-Watt Modulator.

perfect linearity in the final audio stage, an further harmonic attenuation should perhap be added at the output. A pair of "buildin out" capacitors (auto-radio buffer capacito work well) will provide this attenuation. Th one-henry choke used in the filter is a fairl low-cost item in that it can be made from 50L6 output transformer. Only the primar is used and its inductance is adjusted to on henry by inserting a magnetic air gap of car board between the "E" and "I" laminatio stacks as shown in fig. 2. An impedance bridg should be used to check the inductance, whic will vary with the thickness of the cardboar

A 10-Watt Modulator

A circuit diagram of the first of the tw modulators is shown in fig. 3. It was built a part of a lightweight portable rig. The powe supply used is a selenium-rectifier voltag tripler, which also supplies the rf portion o the transmitter. This circuit has been use successfully to modulate transmitters usin an 832, 6360, or 2E26 in the final. The audi output is approximately 10 watts. Althoug 6AQ5's are used in the rig shown, 6CM6 or 6V6's could also be used with no circu changes. These latter types also have som safety factor with regard to the maximu plate voltage. The modulation transforme was salvaged from a surplus 522 transmitte but any small modulation transformer woul be suitable. It should present a load impedanc of 10,000 ohms, plate-to-plate, to the modula tor tubes when loaded by the class C stag The entire modulator is built in a 6 x 8 x 3½ inch aluminum "minibox" as shown in th photo. The metering for the rf portion o

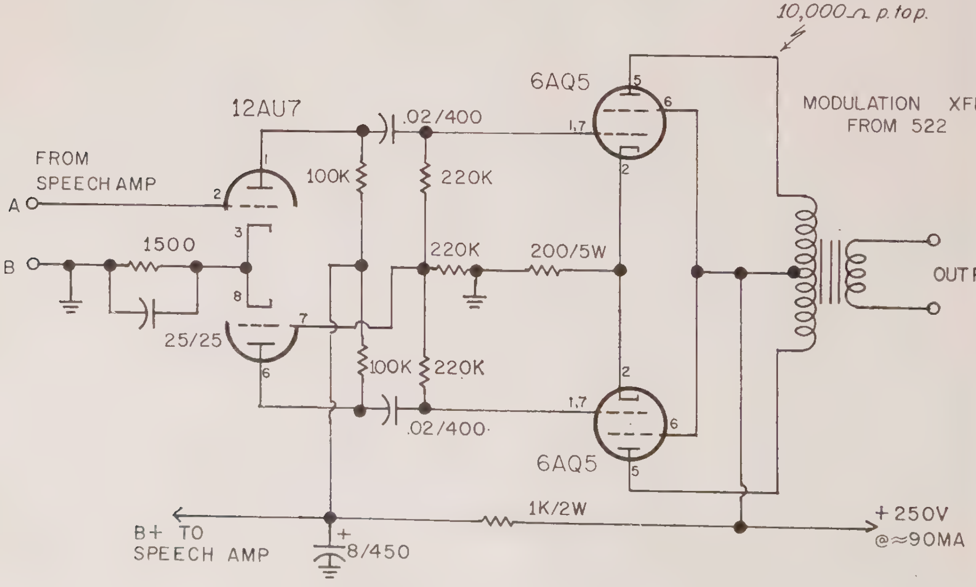
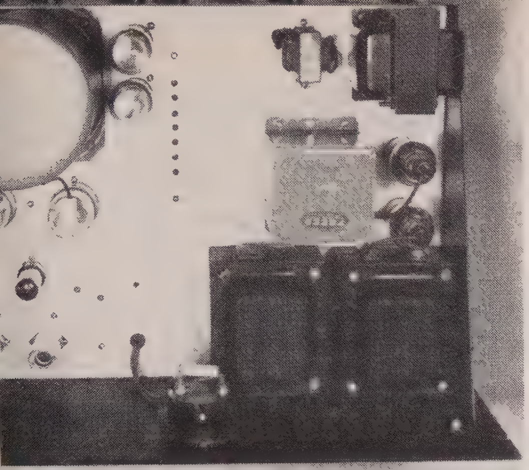
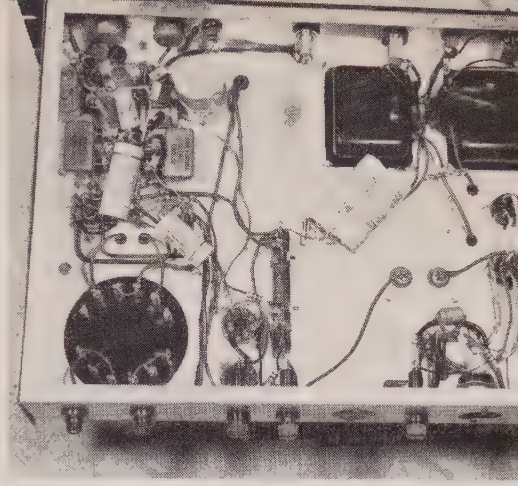


Figure 3. 10-Watt Modulator.





e transmitter is also included in the box. series of ¼-inch holes was drilled in the p and bottom of the box to provide proper ntilation.

55—120 Watt Modulator

A second and larger modulator, two of which e now in use, was also tried. The circuit, shown in fig. 4, uses a 6CG7 or 12BH7 ase inverter driving a pair of 6146's in class B_1. With the voltages shown, the maximum dio output is approximately 75 watts; the fective plate-to-plate load resistance 6500 ms. Table I gives the operating conditions cessary for audio power ranging from 55 120 watts. The above photos show the layout of this modulator and its associated power supply. The unit shown is constructed on a 13 x 17 x 3-inch chassis, but a somewhat smaller chassis could be used, if necessary, without crowding.

The plate resistors for the 6CG7 phase inverter are made of two 220,000-ohm two-watt resistors in parallel. The phase-inverter output will be balanced only if the resistance of R_2 is higher than that of R_1. As was mentioned before, the low-frequency response of the stages following the clipper must be good in order to get the full advantages of clipping. For this reason, the RC time constants in the modulator and phase-inverter coupling circuits are quite large; however C_1 and C_2 could be

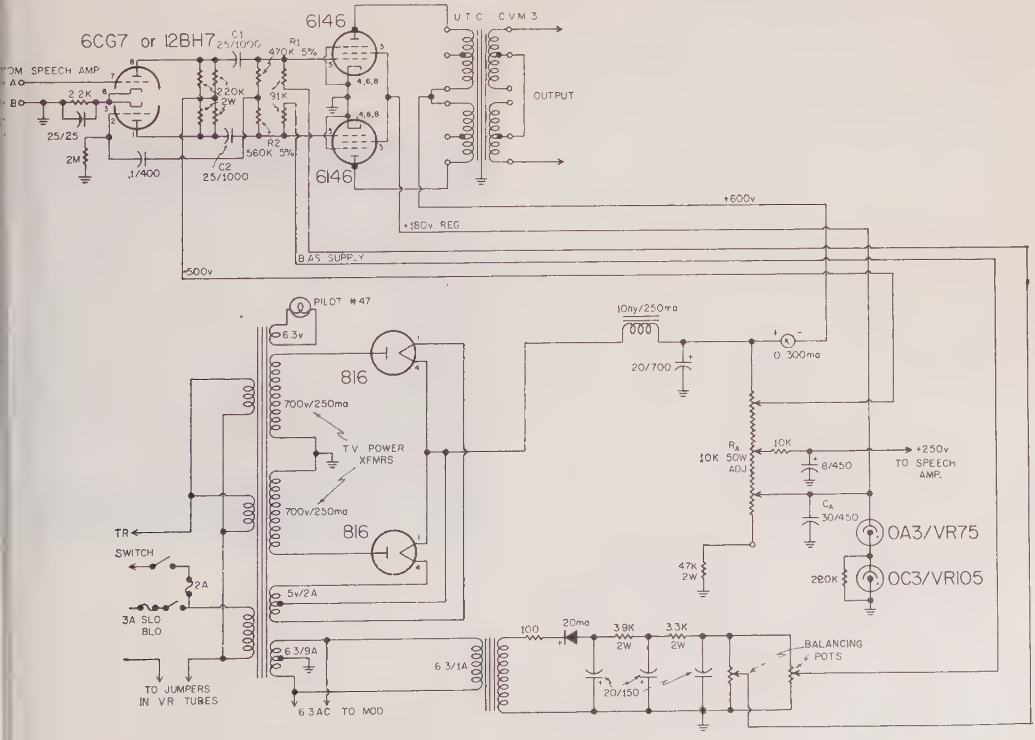


Figure 4. 55-120 Watt Modulator.

TABLE I

OPERATING CONDITIONS FOR 55—120 WATT MODULATOR

	C.C.S.			I.C.A.S.	
DC Plate Voltage	400	500	600	600	750 volts
DC Grid-No. 2 Voltage	190	180	190	200	200 volts
DC Grid-No. 1 Voltage (with fixed bias source)	−40	−40	−45	−50	−50 volts
Effective Load Resistance (plate-to-plate)	4000	5000	7500	5500	8000 ohms
Maximum Signal Power Output (Approx.)	55	70	82	94	120 watts

reduced to 0.1 mfd without a serious loss in performance. A good quality modulation transformer should be used for the output to further insure good low-frequency response. The U.T.C. CVM 3 used here gives excellent results.

The power supply of the unit uses two surplus TV power transformers. One of the filament windings on the plate transformers is used for a pilot; the other filament leads and the secondary center-taps are clipped back and taped. The two transformers have their secondaries connected in series-aiding. These transformers provide an economical way of getting the required high voltage; however, the regulation is likely to be poor because of unbalanced dc flowing in the entire secondary of each transformer and producing a dc flux. For this reason it would be better to use a single transformer, if possible.

To obtain the best linearity and maximum output, balancing potentiometers are provided in the grid-bias supply to the 6146's. The tubes are balanced by adjusting one potentiometer for a rated grid bias, and then adjusting the second potentiometer to make the plate currents equal.

When plate voltage is first applied to the modulator, the grids of the 6146 modulators will be driven positive while the coupling capacitors, C_1 and C_2, charge from the plate supply. This action causes a surge of plate current in the 6146's which might be damaging. The 6146's are conducting in parallel during this period so that no audio output will be noted because of this current. This surge can be reduced by applying the plate voltage to the phase inverter before applying it to the 6146's. The speech amplifier and phase-inverter voltages could be left on all the time. The system used here to reduce the initial surge can be seen in fig. 4. The large time constant, R_AC_A causes the 6146 screen voltage to rise more slowly than the plate voltage of the phase-inverter stage when the plate supply is energized; thereby, limiting the surge of curren in the 6146 stage. Smooth operation of the output stage is insured by the use of fixed-bias regulated screen voltage, and a power supply having good dynamic regulation. (See "About Power Supplies," G.E. Ham News, Jan. 1954.) This modulator is just the thing for modulating that 829B, 4X150A, 5894/AX9903, or pai of 6146's.

Adjustment and Results

Adjustments of these modulators is straightforward. The "Modulation" control adjusts the level at which clipping takes place; therefore it is used to set the maximum output level o percentage of modulation desired. The adjustment is best made by the usual methods using a "scope." It can also be adjusted by listening for adjacent channel splatter in your own receiver with the antenna disconnected. Th "Clipping" control-setting determines the leve before the clipper and therefore the amoun of clipping. It may be adjusted by means o the clipper cathode-current meter as describe above; however, remember that when an *excessive* amount of clipping is used, the background noise may become objectionable, an a fairly quiet shack may sound like a boile factory. For this reason, the amount of clipping should be adjusted to suit the band conditions. This adjustment can best be mad by asking for an on-the-air check by the fellov on the other end of the line.

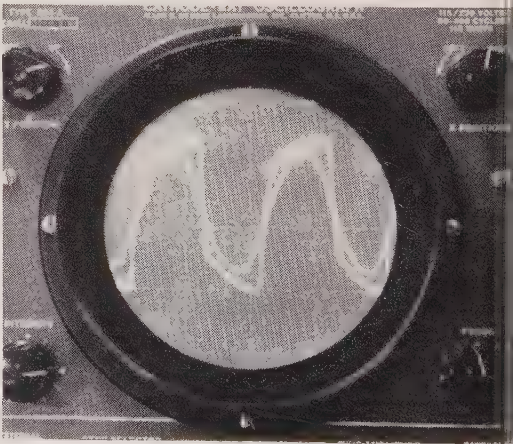


Figure 5. Clipper Performance at 400 cycles.

Performance to be expected is shown i fig. 5. The photograph shows a one-secon exposure of an oscilloscope screen as the inp signal just below clipping level is increased 2 DB (ten times voltage) during the exposur

[*Continued on page 125*]

Transistors in 1923 ????

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Palo Alto, California

Recent receipt of a brochure describing some newly-developed double based silicon transistors recalled some experiments of thirty-odd years ago involving biased silicon crystal detectors, and the occasionally spectacular performance of some of them. These tests were conducted by a large number of radio (we called it "wireless" then) experimenters in and around Montclair, N. J. who swapped notes back and forth regarding the relative merits of galena and radiocite; the vibrating interrupter vs. the electrolytic interrupter; why the Marconi magnetic detector would not work on phone; and similar esoteric subjects now relegated to limbo.

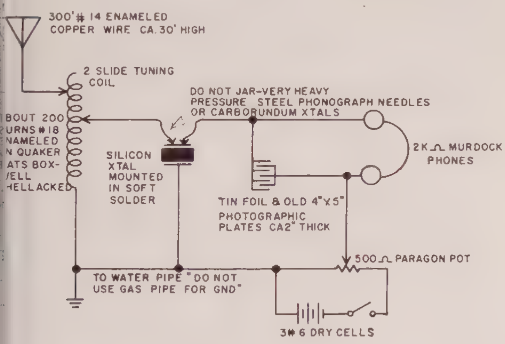
300' # 14 ENAMELED COPPER WIRE CA. 30' HIGH
2 SLIDE TUNING COIL
BOUT 200 URNS # 18 NAMELED N QUAKER ATS BOX- VELL HELLACKED
DO NOT JAR-VERY HEAVY PRESSURE STEEL PHONOGRAPH NEEDLES OR CARBORUNDUM XTALS
SILICON XTAL MOUNTED IN SOFT SOLDER
2K Ω MURDOCK PHONES
TIN FOIL & OLD 4"x5" PHOTOGRAPHIC PLATES CA 2" THICK
500 Ω PARAGON POT
TO WATER PIPE "DO NOT USE GAS PIPE FOR GND"
3 # 6 DRY CELLS

Fig. 1—Double catwhisker biased silicon detector.

Two of these circuits sometimes performed much better than the currently-available audions, which were Tungar bulb sized, and had a spare filament lead, to be connected when the first filament gave up the ghost. These cost about two months' paper route money, if I remember correctly, and ran dry cells down like nobody's business.

The first of these circuits, sketched from memory, in fig. 1, used two catwhiskers. One connected to the tuning coil, which was of the "two slide" variety, wound on a Quaker Oats box, and thoroughly shellacked to keep out moisture. Catwhiskers were usually steel phonograph needles, and very heavy pressure was needed to get the desired signal strength. Sometimes a carborundum crystal was used as a catwhisker, in which case even heavier pressure was needed, and a high bias voltage, such as 15 (ten dry cells, or two weeks' lunch money!!). Even with this heavy pressure, the "sensitive spot" was somewhat elusive, requiring up to two hours of hunting before it was found. When found, the sensitive spots remained useful for only a relatively short time, and the catwhisker was easily jarred to a "dead" position. Because of the high pressures involved, the zone of contact between the catwhisker and the silicon crystal was sometimes crushed into a gray powder at about the time that the sensitive spot got really "hot."

[*Continued on page 115*]

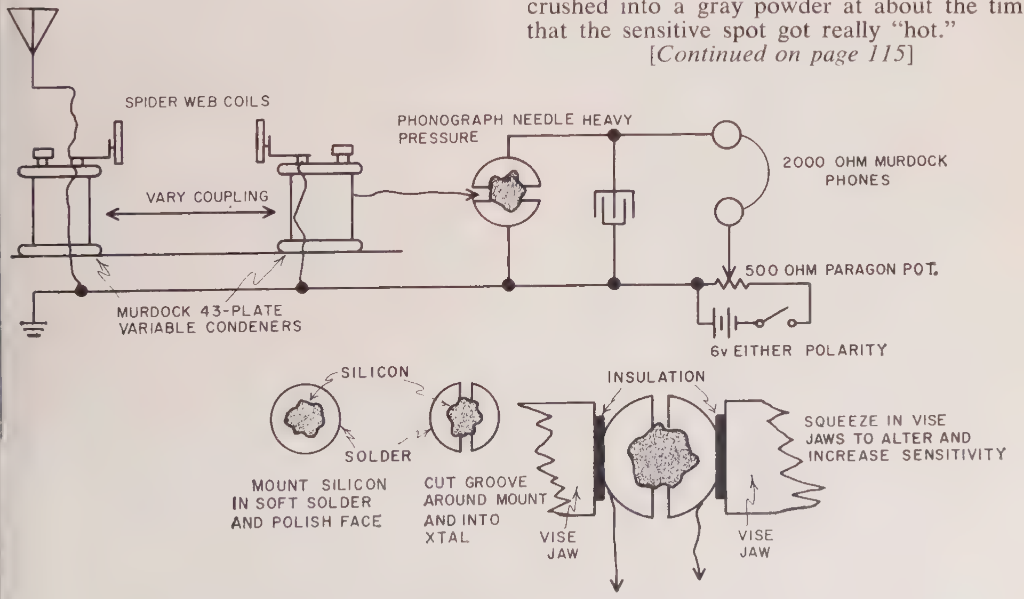
SPIDER WEB COILS
VARY COUPLING
MURDOCK 43-PLATE VARIABLE CONDENSERS
PHONOGRAPH NEEDLE HEAVY PRESSURE
2000 OHM MURDOCK PHONES
500 OHM PARAGON POT.
6v EITHER POLARITY
SILICON
SOLDER
MOUNT SILICON IN SOFT SOLDER AND POLISH FACE
CUT GROOVE AROUND MOUNT AND INTO XTAL
INSULATION
SQUEEZE IN VISE JAWS TO ALTER AND INCREASE SENSITIVITY
VISE JAW
VISE JAW

Fig. 2—"Split Crystal" biased silicon detector.

RECEIVER HOT-RODDING HINTS

Leonard E. Geisler, AES
Japan Electronic Trading Co.
CPO Box 1556
Tokyo, Japan

Not so long ago, general era of 1931-34, John F. Rider wrote a book called "Servicing Superheterodynes." Johnny went very thoroughly into the basic theory of superhets, presenting his material in such a simplified manner that a 10 year old would understand it. If you are able to lay hands on a copy of that early edition, do so. It will help you understand the maetrial I'm about to set down here.

Inspect fig. 1 for a moment. Illustrated is a conventional, double-tuned *if* or *rf* interstage transformer and its response at various secondary loadings.

Note that the output drops rapidly as the load resistance is decreased and the pass-band, or selectivity of the circuit is broadened proportionately as the load is increased.

We see, in fig. 2, a block diagram of a *trf* receiver using one or more tuned circuits similar to fig. 1, and a chart illustrating the gain in selectivity per added stage. Note that the amplification increase is greater than the selectivity increase per tuned stage added. Ph ical (and financial) limitations genera established the number of stages in the old to three, with usually not more than two s of "double-tuned" circuits (using a four-ga variable capacitor) employed. Due to the sta of the art at that time, maximum tuned circ Q was limited to around 100.

Fig. 3 illustrates the increased selectiv obtained through the use of frequency conv sion as employed in the superhet. We ha boldly lifted fig. 4 right out of Mr. Ride book to illustrate *why* the additional selectiv of the superhet. The BC carriers referred in fig. 4 are 1000 kc and 1010 kc, or 1% apa The percentage difference between station c riers naturally increases as the *if* is decrease Considering the Q's available in *if* coils of th day, the lower the *if*, the better.

Another reason that increased selectivity obtained through the use of superhet prin pals is the fact that most, if not all, the a

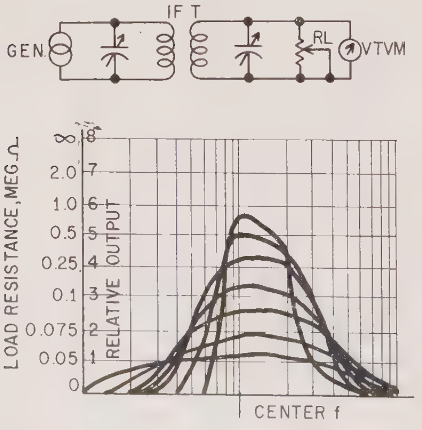

Fig. 1A—Test setup to check passband characteristics of a 465 kc if transformer.

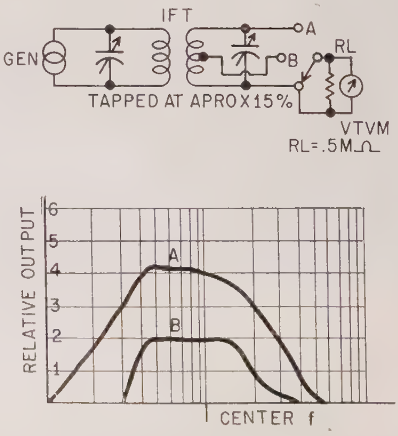

Fig. 1B—Test setup to check passband characteristics of the Super-Pro if transformers.

plification of *rf* takes place at one fixed frequency, allowing amplifiers to be designed for maximum stability and gain.

Most of us know, however, that the superhet is still not the final answer in ham receivers. Nothing, I'm convinced, will ever eliminate "heterodyne alley" on the ham bands better than ridgidly enforced frequency allocations for each and every one of us amateurs. How this could be implemented escapes my imagination at the moment. The only alternative, short of revolution, is to work over our surplus receivers to the point that most, if not all, the undesired signals are sort of shuffled off to the umble-seat on *most* qso's.

Now look, you ssb boys, this'll do you some good too!

Before going much more into basic receiver and tuned circuit theory, let us first make some pecific notes on what to do to a surplus (or ny older receiver) receiver to bring it back omewhere near "factory fresh" condition.

1.—Change any and all bypass and coupling capacitors of the waxed paper or molded types, eplacing with high-grade oil-filled (or mica, if ou're that rich) types. Borrow a friend's ca-acitor tester and make sure the old ones are k before leaving them in. Even ceramic and ilver mica types can go sour, you know . . .

2.—Test each and every resistor in the re-eiver with a reasonably accurate ohmmeter. f you can get hold of a high voltage type, do o. It will show up those noisy resistors in a urry. Replace all resistors which measure more r less than 25% of their indicated value, as a esistor which shows that much change at 1.5 will be much further away from the right mount at normal operating voltage & current.

3.—Carefully remove each i-f transformer rom its can and boil out all those years ac-umulation of moisture in a 60/40 mixture of eeswax and grade A powdered rosin. Remove hem from the boiling mixture after all bubbles ease to rise from the coils. Take care not to rip the mixture on your clothes. Hard to re-ove! Also, don't mix up the coils, you may ave trouble in putting them back in the set.

4.—Dry out the insulation of the wiring arness of your set with a heat-lamp or other eating device. Do not allow the chassis tem-erature to exceed 145° F., or you may melt me of the plastic insulation! After thoroughly king the set out for several hours, coat all e wiring with white shellac while the set is t. This will renovate fabric and rubber type sulation very well unless the rubber has umbled. In this case, replace all the wiring hich cannot be reclaimed.

5.—Re-lubricate all bearings and switch pers, or other rubbing joints & contacts. Dab mixture of penetrating oil and lacquer thin-r on the "c" washers of all tone & volume ntrols, rotating the shafts while doing so. is will reclaim those noisy controls beauti-lly. Lubriplate thinned with lacquer thinner

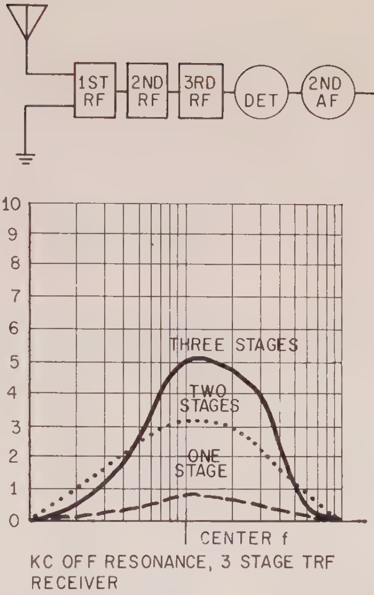

Fig. 2—TRF receiver selectivity change as rf stages are added.

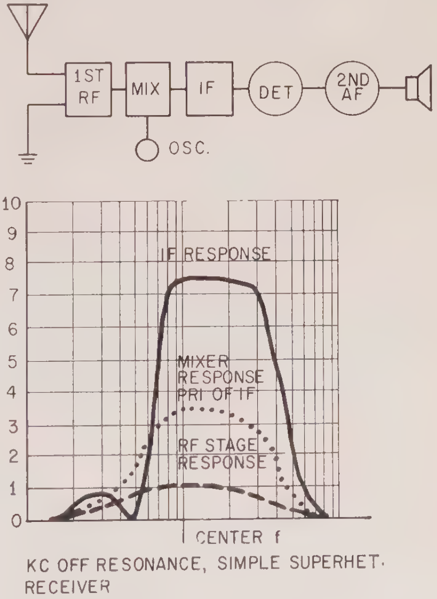

Fig. 3—Superheterodyne receiver selectivity curves. Note the narrower bandwidth due to the if stages.

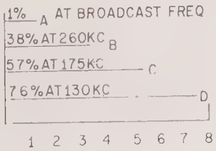

Fig. 4 — Apparent increase in adjacent channel selectivity due to frequency conversion. (After Rider)

is also good for trickling into those hard-to-get-at spots.

6.—Carefully realign your receiver according to the instruction manual. In the event that you don't have one, write me—enclosing 3 International Reply Coupons to cover reply—and I'll *try* to help you out.

7.—Use only premium grade replacement vacuum tubes in your receiver. Although the initial cost is higher, you'll get better service, longer life and eventually reduced cost. Also your dx record will improve along with your temper . . .

Now that we've taken care of the overhaul and renovation problems, let us proceed to the real hop-up data!

About the time that the superhet was just getting popular, a chap by the name of Miller discovered that if you ran *dc* through an inductor which was part of a tuned circuit, the inductance of the coil would be decreased. In other words, the resonant point of the tuned circuit would be shifted proportionally, more or less, according to the amount of superimposed *dc*. Naturally, this would decrease the Q of the inductor too, as the *dc* flowed through an external resistive circuit in shunt with the coil. A very good explanation of this effect, complete with charts showing the actual amount of loss in Q, etc., may be found in "Radiotron Designers Handbook," available in most libraries and bookstores.

Returning to fig. 1, for the moment, consider the fact that we have a good equivalent of a standard i-f transformer (*ift*) shown. A Hammarlund Super-Pro *ift* is shown in fig. 1b Note that the secondary tap yields less outpu voltage but does decrease the Miller effect an shunt loading somewhat. In both cases, th primary of each *ift* is a parallel tuned circui *with plate current flowing through it*. Consider ing the fact that the current flow is proportiona to the strength of a received signal, the *ift wi be in exact alignment only at a signal exactl equal to the strength of the output of th original alignment signal generator*. Naturally this coincidence does not occur very often. W have, then, Miller effect with a vengeance About all the tuning of the primary does is t roughly align the coil to resonance, and an selectivity garnered therefrom is rather inci dental.

To convert any *ift* to a true pass-band selec tive circuit, it is imperative that the *dc* b removed from both primary and secondar coils. A typical case of improvement is show in fig. 5. Note the use of shunt coupling whic removes all *dc* from each coil. Before and afte selectivity curves are shown, taken from BC-348 we converted and hopped up. Con sidering that the *if* is 915 kc, this is a prett good illustration that practically any *if* is onl as selective as the manufacturer decides should be.

To really isolate the *ift* from all outsid influences, especially the secondary, we insert cathode follower between the *ift* and the amplifier tube. Since the cathode follower i lustrated in fig. 6 has extremely high inpu

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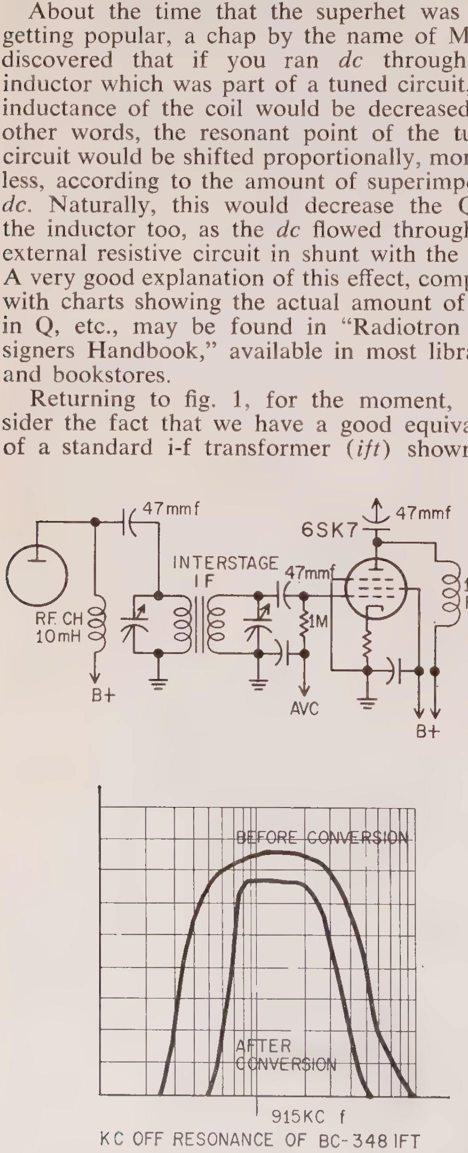

Fig. 5—BC-348 if stage modified to eliminate Miller Effect. Note improved frequency passband.

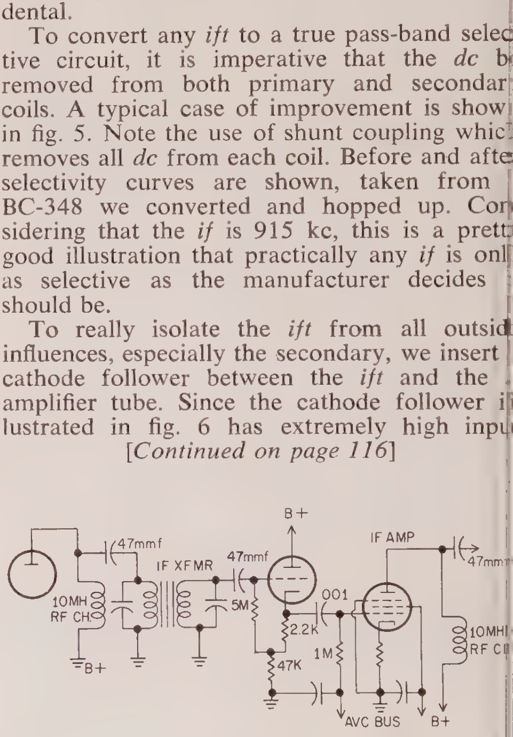

Fig. 6—Practical example of the use of a cathode follower to eliminate detuning of the if, because of Miller Effect.

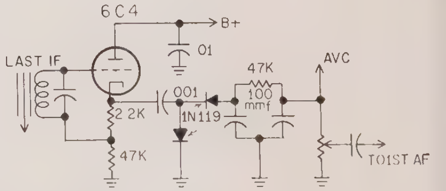

Fig. 7—Cathode follower fed linear detector lightens if transformer loading and improves af response at very low levels. It may be used with anl.

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icago 28, Ill.

Don't Radiate Channel Two

The title is a good one. Several weeks ago not-so-nice pattern on channel two appeared my TV receiver when I came on the air 20 cw. The more I worked on the trouble e more confused I got.

First, I tried one, then two high-pass filters the TV receiver, then one and two low-pass ters in the coax line between the transmitter d antenna tuner; but to no avail.

I tried every idea in the book and some that ren't (plus a few my friends professed) thout success.

Time passed.

I got to thinking that one way to stop all tput would be to ground the grid of the final y test I had arrived at the conclusion that was in the final and not in the exciter stages), t that would also stop the production of rf twenty meters and after all I wanted the rf twenty meters. But then it dawned on me at a series tuned circuit has minimum (theo- ically zero) resistance at the frequency to ich it was tuned, so why not put an induct- ce and capacitor in series from the grid of final to ground, tuned to fifty-seven mega- cles?

I made the inductance of number fourteen re, fourteen turns, close-wound, one-half h inside diameter. The capacitor I used was zero to thirty micro-micro-farad APC type. e leads must be as short as possible and the luctance as far from surrounding objects as ssible.

It Worked Like a Charm

When you do this, make sure that the elded bottom of your rig is on (if you have e) because that may change the frequency the trap. I drilled a hole in the chassis tom big enough for a polystyrene alignment l to fit through. (Incidentally when mount- the capacitor point the screwdriver slot wards so it can be tuned later.) Bring your to the TV or bring the TV to your rig. I used a large light bulb for a dummy load but you can use an antenna if you want other fellows to get mad at you. Tuning the trap is very critical, takes time and can cause a lot of interference if a dummy load isn't used.

Tune channel two on the TV. Tune your rig to the proper frequency and loading and then very slowly tune the trap capacitor and when you reach channel two with it there will be a very pronounced reduction in the pattern on the screen. As I said before, this tuning is critical so be sure to tune slowly and be sure that it's right on the button *after* the tuning tool is removed. A non-metallic alignment tool would be best for this adjustment.

In case you don't radiate enough harmonic for a proper test while using a dummy load you will have to clip about a foot or two of wire on your tank circuit, but turn *off* the power first!

If it happens that your trap does not tune to the right frequency simply make the inductance larger or smaller as needed, I used a grid-dip meter which greatly simplified the job. One thing to remember is to use as little of the capacitor as possible because the more capacity from grid to ground on the final the more rf you will need to drive it properly. Mine worked best when the capacitor was about thirty degrees meshed.

I have a cw monitor which uses a crystal diode to rectify a small amount of rf from my rig to furnish sufficient dc to run a transistor audio oscillator plus a push-pull transistor audio amplifier for loud speaker operation. In my battle for clearing channel two I discovered that every time I pressed the key this monitor coughed up a juicy harmonic right on Channel Two. I put the brakes on this in a hurry by installing an ohmite ZO radio frequency choke in the antenna lead just inside the chassis with a five mmfd ceramic capacitor from each side of it to ground. ■

Modern Station Control

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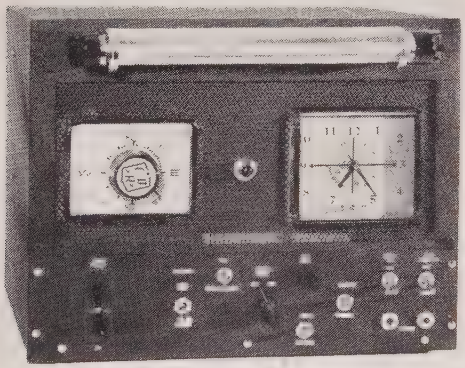
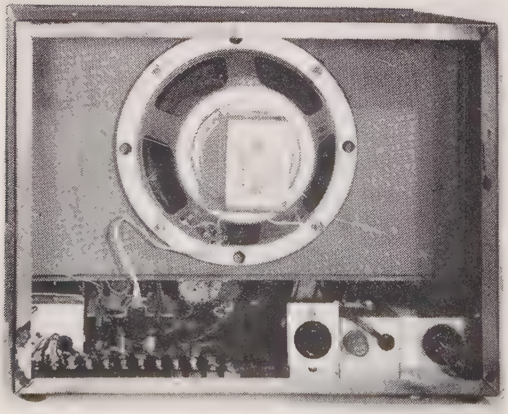
3467 Rambow Drive
Palo Alto, Calif.

When my station was first set up, the nearby double wall outlet took care of the power connection to the receiver and the low power transmitter. The accessories were a key and a microphone. When a power amplifier was built and with it, the screen and bias supply and high voltage rectifier, the wall outlet began sprouting cube outlets and extension cords. Then came the beam antenna and with it, the rotator control and the electric brake. They too required line voltage! The tangle of wires, with cube upon cube and the double wall outlet was something I would rather not have a fire insurance inspector look at. As the desire for life's better things possessed me, I began accumulating such "musts" as a cw monitor, a *one kc* audio filter and a phone patch. I began looking for a suitable electric clock and desk lamp and checking my stock of cube outlets. While trying to determine which of the above mentioned accessories I'd have to shift around to make room for said clock and lamp, an inspiration suddenly struck! Why not put everything under one roof! A visit to the local supply store where a utility cabinet and a few switches were obtained, a stop at an electrical supplier yielded a Lumiline fixture and an electric clock. Now the job is done





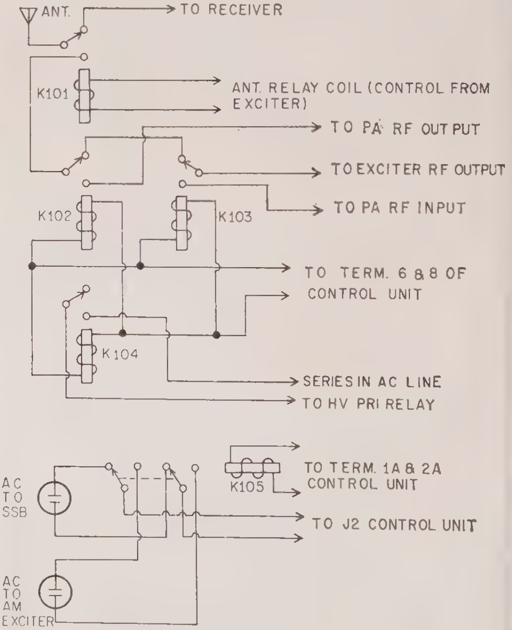


Fig. 1—Control unit relay board wiring.

and only *one* receptacle on the wall outlet is in use. The only visible accessories now are the key and the microphone.

This control system can be designed to fit anyone's particular requirements and is one of the easier "do-it-yourself" jobs.

Before the days of the control system, changing from low power operation for local QSOs to high power for DX operation was a bit of a chore for a lazy man like me. It meant throwing a few switches on a few pieces of equipment, disconnecting and reconnecting co-axial lines and reconnecting line cords that slipped their connection. Now this is all done by a couple of toggle switches on the control panel. Every piece of equipment requiring power obtains it through the control system. A master switch, in this case a magnetic circuit breaker, removes the power from everything in the station except the electric clock. The beam indicator and the electric clock, were removed from their cases and mounted on the perforated metal front panel. This panel is hinged from the cabinet top so that the clock or beam control unit is accessible for adjustment. The eight inch loudspeaker was removed from its enclosure and mounted on a 9x15x⅜″ plywood baffle and then fastened inside the control unit cabinet, in back of the beam indicator and clock. The sound from the speaker emanates from the perforated panel. The control system cabinet contains the following accessories:

A hybrid phone patch for voice controlled operation. A transistorized, self powered cw monitor. One *kc* audio filter for cw reception. Loudspeaker. Beam direction indicator and control. Electric clock.

The controls on the panel are, left to right: Main power circuit breaker; High-Low power warmup switch; High-Low transfer switch; Phone patch switch; Phone line volume control; Switch for either SB or AM & cw; Speaker or Phones switch; One KC filter On/Off switch; CW Monitor On/Off switch; Monitor phone jack for speech input line; Receiver phone jack.

Operation

When master switch is ON, the following equipment is energized; Receiver; either the SSB exciter or the AM exciter, depending on position of the SSB-AM switch; beam control and beam brake units; the lumiline fixture and a pilot lamp indicator. With the High-Low warmup switch in "On" position, power is supplied the heaters of the power amplifier tubes, bias and screen rectifier and to the filaments of the high voltage rectifier. After warmup, the High-Low transfer switch is

[*Continued on page 114*]

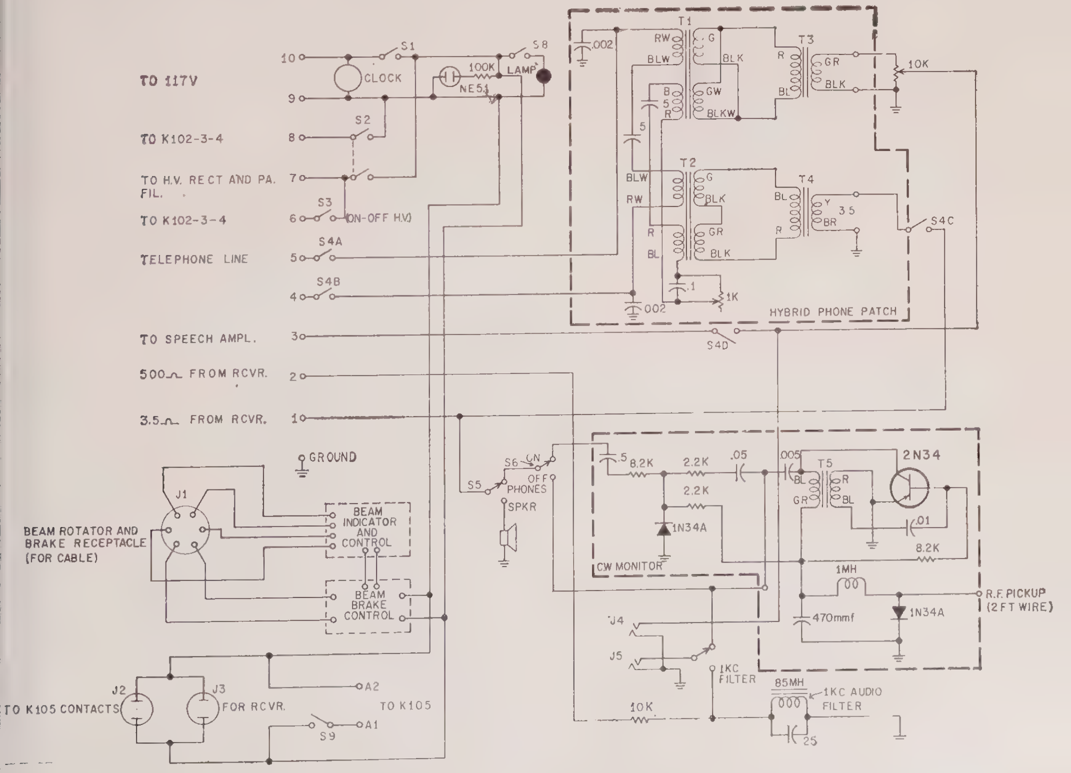


Fig. 2—Circuit of the main control unit. (Partslist on page 114)

Are You a O!!%¢**Xxx?

Ol' Joe

War has long been waged between the brass-pounders and the modulation boys of our beloved fraternity. Maybe not total war, but cool disagreement. Ol' Joe—that's me—has long leaned toward the key. Not 100%, mind you, but more than 99%. Everywhere we hear the boast, or the lament, depending upon which side you're on, that cw is a dying art. Until last week, I opposed that contention vigorously, but another week like the last one will send me shopping for a microphone, and the garbage man will find a much-used key on top of the heap on Monday morning.

Here's why. I had three days off from my arduous labors for the telephone company and the spouse didn't have many odd jobs laid out, so I settled down for a lot of happy, relaxed brass-pounding.

Like the old gray mare, cw ain't what it used to be, and I'm fed up to the bicuspids with what it is getting to be. True, there are still some around who can make music with a bug—KH6IJ, W0SMV, and many others, but the ranks are getting thinner all the time, and the stuff you have to wade through to get at the good ones—Oh, Brother! Listen—

In the first place, I enjoy a little DX, and called "CQ DX" five consecutive times. I know the hot-shot DX men say that's the mark of a lid, but the boys on the other side that I've talked to say they prefer hearing a "CQ DX" because they know the W's and K's will be listening harder for an answer. Anyway, five times I called, and here's what I got—a K7, a W1, two W2's and a K4. Years ago, when I was running 12 watts to a 6L6, any one of these was DX. After five attempts, I let the air clear (it was blue in the shack), dropped the "DX" from my CQ, and flipped the switch. I worked nine stations in a row at an average speed of 4½ words per minute. How in the —— those guys got a General ticket I'll never know. Or maybe they're renewals? I heard a W4 on 10-'phone tell a W0 that he hadn't touched a key for 15 years, and doubted if he even knew the alphabet anymore. Wonder if he ever read paragraph 9 of FCC Form 610 when he applied for renewal? That's the one that says: "I (do, do not) certify that I have satisfied minimum operating time and code speed requirements of rules for renewal of amateur operator license."

I slowed down for 'em and sweat out myriads of commas and periods throughout their transmissions—something unheard of until recent years. Grammatically, maybe they're correct, but a big waste of time on cw.

Another hot-shot I can do without is the goon who started every transmission like this: "R R R R R W0—de W2—R R R R."

Reams have been written about the Novices who mangle our long-established procedures, but these QSO's were on the General frequencies. I heard one puny signal calling CQ and thought it might be a little DX. I counted 38 CQs from this joker, and the usual Novice-style "de de" before he signed. That's not a record, of course. One member of our club reported hearing one that went 76 times before signing. It was a K2. I wondered how many others listened to that fancy operating, and used the same language I did before leaving the frequency.

And where did that "Hw copy" phrase originate. I operated cw for many years without hearing it once, but in the last year or two—ohhhh, boy! That little jewel belongs in the same place as the "so back it comes to you" and I know just the place.

I give someone a 5-8-9 report, and he comes back to me, repeating everything at least twice. Why, oh, why? I class him with the "diddy-dum-dum-diddy" idiot, who intersperses his transmissions with asinine junk—"dit-dit-dit-diddy-dit-dit," and variations. If he can't think of anything to say, whynell doesn't he shut up?

I've saved the most horrible example for last. I happen to live in a state that must be classed as rare DX (not Delaware, boys). Eleven of the first 14 QSO's I had all said "you're my first————. Pse QSL. ADRS is————." It's like this: I've always answered every QSL I receive, and I always will. I used to QSL 100%, but I've had WAS for years, and don't collect QSL's anymore, except for occasional DX. In bygone days, when I got one of those fervent requests for a card, I always sent it, but when I found the returns were only about 55%, I got mercenary. (That means tight.) My cards cost two cents each. Stick on a three-cent stamp and there goes five cents per card. Taking last week as an example, ten QSLs used up fifty cents, or enough to buy six and two-thirds of my favorite cigars. So now I'm probably classed as a senior-grade slob by a number of the "pse QSL, the adrs hr is" boys, because I haven't done so. I always tell 'em "will QSL upon receipt of yours." Here's a little advice to those eager-beavers—remember,

[*continued on page 113*]

Improve Your Rig

with a Built-In Audio Oscillator

L. H. McMahon, VK2AC
22, Pitt Street
Randwick, Australia

The inclusion of an inbuilt audio oscillator in radio telephony transmitters is a most useful adjunct, passed up in all but the most rare cases. In an AM transmitter it can supply a modulation pattern which can be made stationary and thus allow a definite check. In DSB transmitters it provides a two tone test and, together with some carrier insertion, it will provide the same test for an SSB rig. It is a luxury that is simple to provide and its addition is well worth the slight extra cost and work involved. Manufacturers of transmitters would do well to add this small convenience to their designs. The time honored whistle method of checking modulation is not very satisfactory since nobody has the respiratory capacity and the laryingeal control to do the job properly.

The audio oscillator described here was designed for the utmost in simplicity, good output waveform, infallability, and for the universal availability of its parts. It is most dispiriting to construct an article and find that it does not provide the results promised, or to find that no one in your country has ever heard of the P6-7/8 coil which was specified.

This oscillator uses two triodes. They may be in one envelope such as the 6SN7 and 6SL7, and their 12 volt equivalents: 12AH7, etc. They may be separate 6C5's, triode connected 6AC7's, hardly anything you may select will fail to work.

The output frequency is determined by L and C, naturally. All sorts of inductances will unction satisfactorily in the circuit. Excellent operation has been achieved with the primary of an old speaker transformer and with various odd filter chokes. You can "tune" your oscilator by varying "C" until it is where you desire.

R1 is a dropping resistor so you can use whatever power supply is available and therefore limits the output of the oscillator. R5, the coupling resistor, is made as large as is practicable for the best waveform is obtained when the coupling is kept to the minimum necessary for oscillation.

Make sure that the output of the oscillator is reduced enough so that when it is tuned on there is no need to make a grab for the volume control to save things from blowing up. R1 can be changed until it is found that the volume control has to be turned up to get normal operating conditions when the oscillator is substituted for the microphone. ■

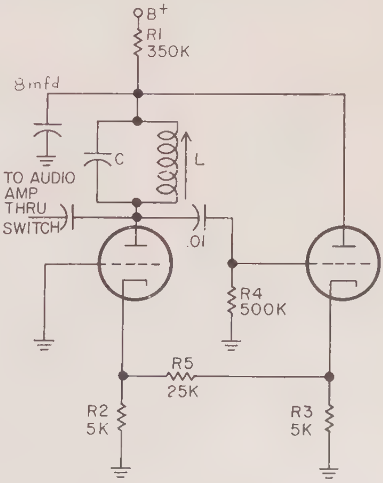
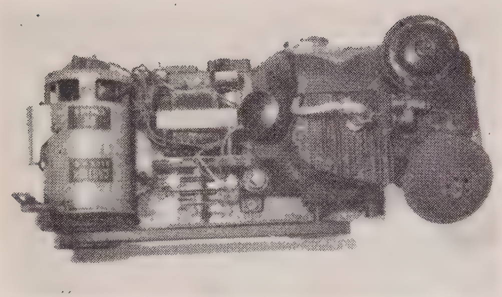


Fig. 1—Circuit of a simple audio oscillator that can be added to most rigs. The tube may be any of the dual triodes described in the text.

A Poor Ham's Power Plant

Gilbert L. Boelke, W2EUP
505 Main Street,
Ebenezer 24, New York



Here is a home-made puttputt that is inexpensive to build, very portable, and delivers just about 350 watts of 115 volt 60 cycle ac, enough to operate a receiver, 30 watt transmitter, electronic bug, Conelrad monitor, and a 40 watt lamp.

The regulation curve is shown in fig. 1.

Essentially, it consists of an old lawn mower engine driving a modified 6 volt automobile generator to get 115 vac. Wait now—don't let the modification scare you. My first try at it took about two hours without the instructions to go by. The total cost for me was only about $6.50, since I was lucky enough to have a generous brother-in-law with a spare lawn mower engine!

Most lawn mower repair shops have used engines available at moderate cost. I priced a two horse job at 15 bucks, and two HP is about four times what is needed here. Mine is a Briggs & Stratton 4 cycle, ½ HP engine with a governor on it. Make sure yours has a governor.

Generator

The generator is a 6 volt, 35 ampere Delco or Auto-Lite automobile generator. I picked one up at a local junk yard for $2.50, including

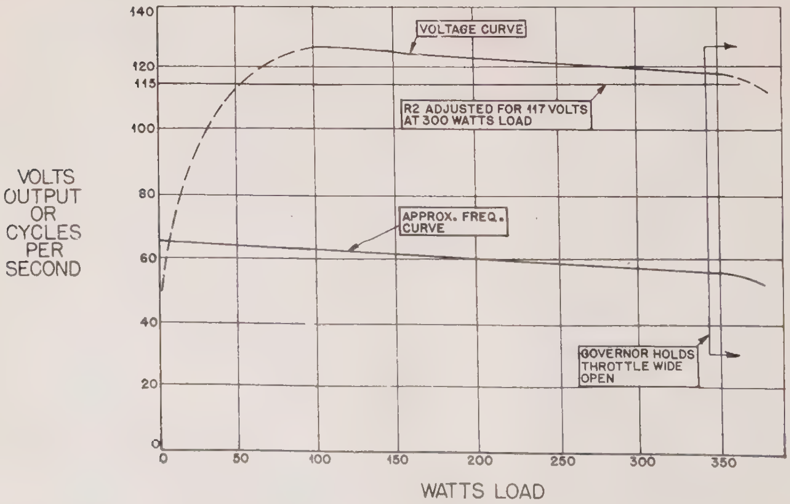


Fig. 1 — Regulation data for the power plant.

mounting brackets. It came from a 1946 Plymouth.

The field is excited by means of a step-down transformer and a low voltage selenium rectifier. The transformer should have a 115 volt 60 cycle primary and 20 to 30 volt center tapped secondary, good for about 3 or 4 amperes. The field only draws about one or one and a half amps, but the full output current of the generator flows through the secondary, as can be seen from the circuit diagram, fig. 2. The transformer I used came from an old pin-ball machine. Some model train transformers have suitable windings. Various taps will prove to be very helpful when you start adjusting the compounding circuit for best voltage regulation.

The rectifier must deliver 8 volts or less of dc at about 1½ amperes, and anything you can scrounge up that will do the job is fine. One way to get one for about two dollars is to take apart a standard 500 or 600 ma. TV selenium rectifier and rearrange the plates for low voltage operation. Fig. 3 shows the initial and final arrangement of plates. The between-plate contacts can be cut from tin-can metal, and the eyelet can be replaced with a long bolt to hold the stack together when you are finished.

Generator Conversion

A good way to start is to give the thing a bath so you can handle it easier. Remove the brushes and take out the two long bolts that hold the back and front plates together. These have screwdriver slots and are located on the back plate. Pull off the back plate, then the front plate. The armature comes out with the front plate. You don't have to disturb the pulley or the front bearing. Working with the armature:

(1) Using a heavy, well tinned and hot soldering iron, unsolder and pull out all of the connections to the commutator bars.

(2) Use a large screwdriver or any suitable piece of metal to remove the retainers from the slots to free the windings.

(3) Remove all of the armature windings and discard.

(4) For rewinding, 1 lb. of #20 Formex or Formvar wire will be required. Solder one end to the shaft just on the pulley side of the armature laminations. Make sure the joint is solid, then wrap and tie the wire around the shaft to take off any mechanical strain. Before proceding further, check the insulation of the slots. Make sure there are no exposed metal edges which could cut through the insulation of the wire, causing a short circuit.

(5) Rewind as shown in fig. 4. There are 14 slots, so we have 7 coils, all in parallel planes. Each coil has about 50 turns. 5 turns more or less shouldn't matter too much, but it is better to have more than less. The only thing to remember is that all turns go in the same direction. Replace the retainers as each coil is completed.

(6) Bring the end of the last coil out on the commutator end, and after scraping the insulation, wrap it around all of the commutator bar ends so as to short them out to form a slip ring. Solder the wire all around.

(7) Slap on some varnish or shellac to keep the wires from moving around, and the armature is completed.

Take a look at the field coils in the main part of the frame. Note that one wire goes to the "field" terminal (Small screw terminal) and the other end is connected to the insulated brush holder. There is also a lead connecting this same brush holder to the "armature" terminal. (Large screw terminal) Remove this lead. Disconnect the field from the insulated brush holder also. Connect it to the "armature" terminal. You now have the field winding brought out through the two terminals on the

[*Continued on page 111*]

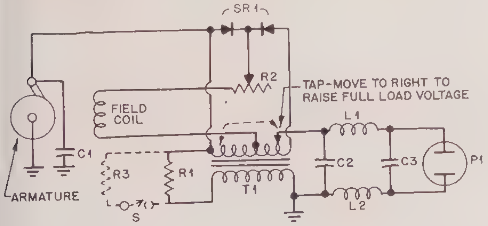


Fig. 2—Schematic and parts list for the generator.

PARTS LIST

C_1, C_2, C_3—0.01 disc ceramic capacitors.
SR_1—See text.
T_1—115V. 60 cyc. pri.-sec. 20-30 vct 4 amperes, preferably with some taps for adjustments. Adjustment necessary only initially.
R_2—5 or 10 ohm wire-wound rheostat, 4 watts.
R_1, R_3—Approx. 500 ohms, Depending on T_1.
Power-S. See text.
L_1, L_2—25-50 Turns #14 E. ⅜" diameter (wire from old armature winding is O.K.).
P_1—Duplex A.C. outlet receptacle.

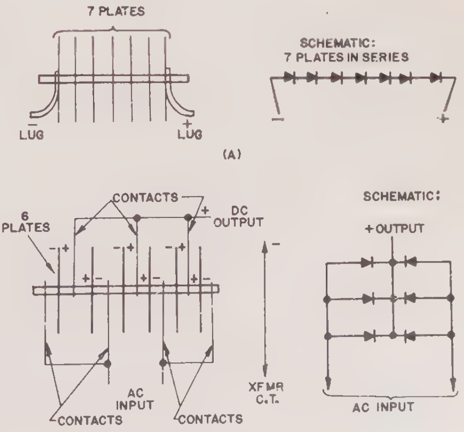


Fig. 3—Selenium rectifier conversion data.

Negative Cycle Loading

Lee Shaklee, W6PQW
130 Hubbard Ave.
San Lorenzo, Calif.

"By their fruits ye shall know them."

Yes, indeed. And if the branches of your tree are hanging over into your neighbor's yard, can you blame him if he squawks about the obstruction of his view? Or if he implores you to cut off the offending member?

Enough of mixing metaphors. Let's get down to brass syntax. When you throw your carrier on the air in any amateur phone band, that carrier, with all its attributes, is *you.*

Your on-the-air personality may be dulcet, smooth, easy to get along with—or it may be obnoxious and raucous, butting in on other conversations, breaking them up and ruining a pleasurable chat. Or, worse yet, it may be clobbering a rare DX contact.

What would you think of a person who behaved that way down at the office?

At this point you may well be asking why all this rigmarole. There's an old adage in the selling profession which states that no one can be sold the answer to a problem until he first admits and agrees that there *is* a problem. He must further admit that he, too, has that problem. Then—and only then—will he consider "buying" the answer.

It's my job, therefore, to "sell" you on the idea that, unwittingly perhaps, you *do* have this problem.

What is the problem? SPLATTER!

I can hear the screams now; "Who? *me?*"

Yes, Podner, *you.* Oh, possibly not all the time, but often enough to wrinkle the noses of your fellow hams. Do you ever raise your voice or crawl a little closer to the mike when calling a rare one? Has anyone ever *accused* you of splattering? Does it seem as though an awful lot of fellows are using receivers with drastic over-load problems?

Wouldn't you like to live in a brick house instead of a glass one, so you could get after those other guys who are *really* splattering without their throwing it back in your teeth?

Sold? Let's hope so, for splatter is easy to eliminate.

The predominant cause of splatter in any transmitter, be it home-made or commercial, are the negative audio peaks. There are, of course, other causes: distortion or overload in the speech amplifier, the same situation in the class B modulators or the modulation transformer, lack of proper "Q" under load in the grid or plate circuit of the final amplifier, lack of linearity in the final—all can create splatter at far less than 100% modulation.

But it is the negative cycle of audio which is the major culprit. There is a technique which is, undoubtedly, the finest currently available for cleaning up a phone signal. This technique is Negative Cycle Loading.

For years John L. Reinartz, K6BJ, has regaled his fellow hams to use this system. Thousands of us received his paper entitled "Increased Audio Without Splatter," but I'm afraid that, in most instances, it was stuffed back in the manila envelope quickly. The reason isn't obscure. John is a marvelous electronic technician and a capable writer—for other electronic technicians. For plain old ordinary *Sam Ham,* the amateur Amateur, his arithmetical gymnastics can have a stupefying effect.

As a result, his ideas have not seen the general application to which their merit entitles them. Negative Cycle Loading, however, is so excellent, so simple and inexpensive to install, that every transmitter on the air should be using it. For when it is used, *negative peak splatter ceases!*

Suppose we talk it over in plain, rag-chew language. It has been said for years (and everyone has been blindly following the leader like a pack of sheep) that the impedance on the secondary of a modulation transformer is the impedance of the modulated class C stage. This, Reinartz says, is hokum!

For the sake of this discussion, assume a class C modulated amplifier running 1,000 volts at 100 mils, with a resulting plate impedance of 10,000 ohms. According to time-honored textbooks and "authorities," this is the load presented to the secondary of the modulation transformer.

Is it? When? at 0% modulation? 50% posi-

Bill Wilson, W6WTH
P.O. Box 188
Glendale, California

DXpedition . . . . Hades

Most of us remember old Leo, W6QRT, ho passed on a few years ago, but probably t too many have heard of his exploits after left this old earth.

It has been reported via the underground that e to a somewhat immoral life on earth, he as finally directed to take the lower road and port for duty in Hades. Here, much to his rprise, he was hastily summoned by Satan d told to take charge as Chief Radio Officer a big job down there which surprisingly was ll open.

"What? Radio down here!" — He was azed when Satan laughingly assured him ey had nothing but the best and quickly hered him into *HE-1L* a more exciting Radio ation than Leo had ever dared dream of. ell, he thought, this IS really wonderful—re was a new Coolins 75A-7 Receiver, just a eam on the drawing boards back in the States A 15KW Transmitter, almost a duplicate of home station—and what an antenna—a 1,000 ft. mast with 8 six-element Helerex Beams, well stacked.

His heart jumped with joy when the guards released him and Satan commanded him to man the station and take over the 20 meter band.

He quickly turned on the 75A-7 and sure enough here was an old friend W 6 whY whY "John" asking *AP-4-0/NO* to please just mail him a report if he was copying—same old trick of John's—he thought, but what a scoop it would be to give *W 6 whY whY* a new country first, so he switched on the transmitter, tried to zero the frequency in the receiver only to find the transmitter was crystal controlled and no crystal in the socket. At his left was a whole barrel of crystals, just like the War Surplus stock at Ded Henries store back home. He tore them open by the hundreds for a proper crystal and finally turned to Satan and asked, "Where are the crystals for the Ham Bands?"

Satan roared—"Why we have none for Ham Bands—That's the HELL of it down here." ■

Experimental 60 kc Standard Broadcasts

National Bureau of Standards
U. S. Department of Commerce
Washington 25, D. C.
June 1957

n experimental 60-kc standard frequency broadcast, un July 1, 1956, at the Boulder (Colorado) Laboraes of the National Bureau of Standards, is opening several interesting applications, some of which are ady in use.

he Bureau has been broadcasting standard frequencies e 1923. Through the years higher power and more uencies have been added until at present the NBS dard frequency broadcasts are on six high frequencies , 5, 10, 15, 20, and 25 mc) at WWV, Beltsville, Mary-; and on three (5, 10 and 15 mc) at WWVH, Maui, ritory of Hawaii. Up to 10 kilowatts are radiated on e of the frequencies.

easurements by the Boulder Laboratories and others revealed that the regular standard broadcasts at frequency (HF) are subject to changes in frecy as they travel away from the transmitting anten- These changes are caused by disturbances in the proption medium and the errors introduced may at times unt to ± 3 parts in 10^7. This is sufficient to make e HF broadcasts unsuitable for many applications, rapid assessment of drift in the manufacture of highision quartz resonators, intercomparison of frequency dards, and accurate time measurement or synchronion of events at two or more locations which may be separated by thousands of miles. Two techniques are now available for precise frequency calibration, but both have limitations. One such technique, employing time comparisons, requires expensive terminal apparatus and a measurement time that extends over 1 to 10 days or even longer. The other makes use of a ground wave near the transmitter. This introduces an error in propagation of less than 1 part in 10^{11}, but is useful only to about 20 miles from the transmitter. At distances of greater than 20 miles the skywave must be used, and calibrations made by means of this wave are not adequate for the ever increasing precision required by an expanding science and technology.

To meet this urgent situation, W. D. George, Acting Chief, Radio Standards Laboratory, initiated a plan to begin the experimental broadcasts at several low or very low frequencies. The 60-kc frequency is being put into use first under the call sign, KK2XEI.

The principal reason for studying standard frequency broadcasts at frequencies below about 100 kc is to determine a practical method whereby the radio propagation errors are minimized and users may accomplish high-accuracy frequency comparisons in a shorter measurement time. Users also need a better time or phase reference to

[*Continued on page 59*]

U OF I
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Where is the DX?

W. H. Anderson, VE3AAZ
Ashburn, Ontario, Canada

Granting that any sort of directional antenna is a great boon to the DX man, one problem remains—proper aiming. In the majority of cases, the purpose of a beam is to raise the total-countries-worked score, so it is worthwhile to investigate how the DX prefixes are distributed in terms of great circle departure angles from three typical areas.

Taking the countries list, various published tables and a few formulas from the spherical trigonometry, three tables of directions in five degree intervals were prepared. These, when plotted on polar paper, appear as figures 1, 2 and 3. While graphs were only prepared for these three specific areas, one can derive a general idea of the situation in the other North American QTHs.

One interesting point is that from the west coast, 27% of DX countries involve paths through the auroral zone. This is reduced to 16% for the central U.S. and drops to 14% for the east coast. (There probably is a suitable editorial comment to be made here, but I can't seem to think of it).

To visualize the situation from the point of view of antenna orientation, it is now necessary to consider how many DX countries would be "covered" with a beam centered on a certain azimuth and possessing a certain width. Figures 4, 5 and 6 show the percentage of total DX countries that would be encompassed by a 30° wide antenna pointed in all possible directions. Looks as though all rotaries should have a quick-return spring to bring them back to northeast frequently when the band is being combed for DX! ■

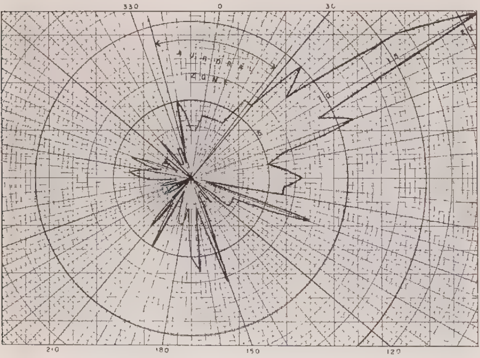


Fig. 1—Number of countries Vs. azimuth from true north-Mid east Coast-U.S.

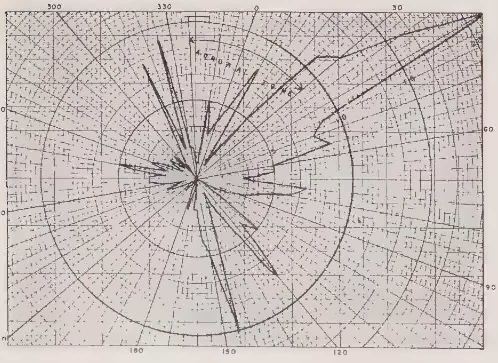


Fig. 2—Number of countries Vs. azimuth from true north-Central U.S.

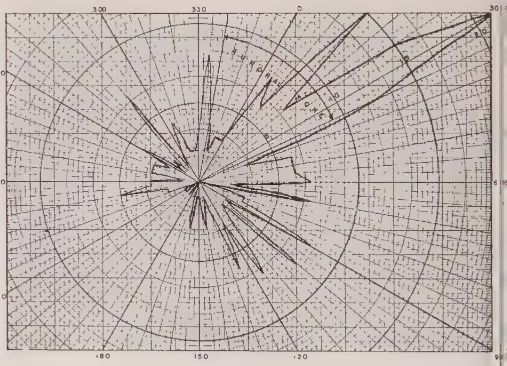


Fig. 3—Number of countries Vs. azimuth from true north-Mid West Coast-U.S.

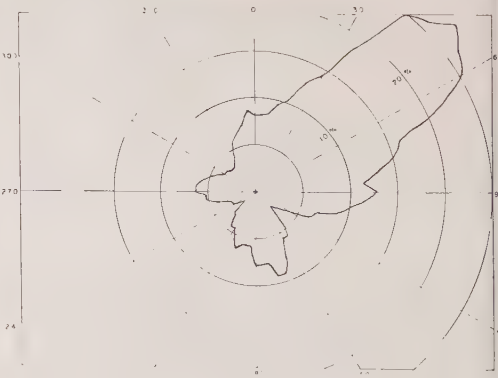


Fig. 4—Percentage of total countries covered by a 30° antenna Vs. azimuth from true north-Mid east Coast-U.S.

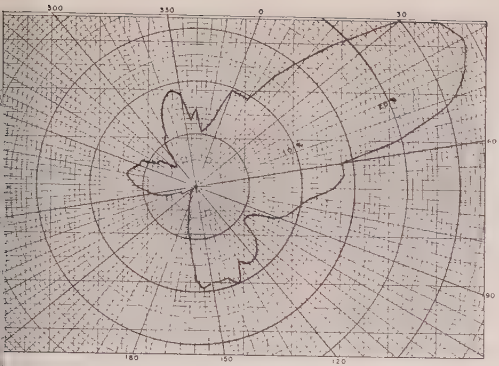


Fig. 5—Percentage of total countries covered by a 30° antenna Vs. azimuth from true north-Central U.S.

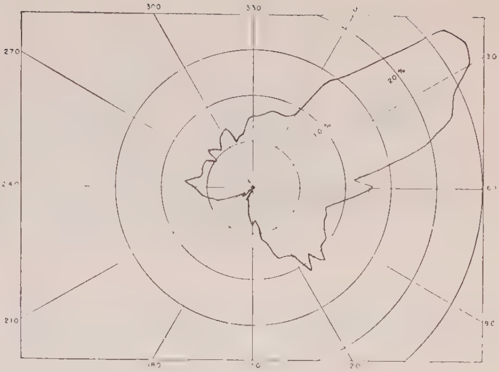


Fig. 6—Percentage of total countries covered by a 30° antenna Vs. azimuth from true north-Mid west Coast-U.S.

The Last Gasp

Bill Ashby, K2TKN

Box 97, Pluckemin, N. J.

Once upon a time, Amateur radio meant
ilding and operating Amateur radio equip-
nt. If one were fortunate enough to get his
lective bucket of bolts percolating long
ough to bang out a CQ, it was possible to
k to some other Amateur who was also
the process of improving his rig. The QSO
s about Amateur equipment and operation.
QSO with DX half-way around the world
s a real accomplishment, resulting from
eks, or years of hard work.

Today, just listen to the bedlam on the so-
led DX bands. Forty-seven screaming idiots
every pile-up, blaming everyone else for
ising all the trouble, listening to the hetro-
nes on a receiver that was designed twenty
irs ago—built two years ago—and only seven
re payments and it will be his. Want to
rk DX? Simple, just dominate the frequency
iow?—just mortgage the house and get one
the new? SUPER-DUPER POWER HOUSE
)0's. That plus about a 1000 bucks of an-
nas, wind-up towers, and such, and you can
mp the frequency.

Just change the terms a little, and you have a good description of the same conditions that existed in the last gasping days of spark. What happened then? Some far-seeing individuals just cancelled all existing Amateur (?) privileges.

The Amateurs were assigned a string of completely worthless frequencies that no known equipment would work on, thousands just gave up and quit, but in twenty years, Amateurs not only devised equipment but ways of utilizing it that are now standards of the commercials.

If all Amateur bands below 432 mc were cancelled tomorrow, what would happen?

Thousands of guys would give up and start collecting stamps, etc., but W1's would be working W6's on 1296 mc before the end of the year. Traffic men would find hundreds of megacycles of QRM free frequencies on which to relay traffic. NO TVI. WOW!

Amateur radio would once again be Amateur Radio.

I'm starting to build a UHF rig now—how about you? ■

Twin lead Traps
Help Stamp Out TV (I)!

Jim Kyle, K5JKX
2737 S.W. 60th St.
Oklahoma City 19, Okla.

While reams of paper—not to mention several thousand cubic feet of breath—have been exhausted on the subject of Tennessee Valley Indians, there's nothing like an anguished howl from the landlord when the band is open to bring it to mind.

Of course, you know your rig is clean. Not a harmonic escapes, you have no splatter, everything is exactly correct according to all the regulations.

But did you ever try to explain that to an irate neighbor, who also happens to collect the rent, when she can't see Lawrence Welk for your sound bars?

The problem is especially acute for *vhf* enthusiasts, which includes me and my wife, K5QGO. High-pass filters are fine for the low-frequency laddies, but they simply won't do it right on 50 *mc*.

Fortunately, though, there's a simple way out—other than taking up stamp collecting. Total cost should be something under 10 cents, even if you have to buy everything, and time for installation averages about 15 minutes.

To start with, let's point out that TVI is usually a different sort of problem for the 50 and 144 *mc* gang than it is for those on lower frequencies.

The low-frequency group has to battle harmonics, but *vhf* guys and gals are more likely to run into trouble with their fundamentals.

Few TV sets on the market today have enough selectivity in the front end to keep a strong 50 *mc* signal from getting into the mixer, where it cross-modulates and produces sound bars on all active channels. A 144 *mc* signal will do the same thing.

There is nothing you can do in your shack to cure this situation—except throw the big switch and go to bed. The trouble lies in the TV set, and it has to be attacked there.

But before you have visions of tearing up your neighbor's set and redesigning it, remember there are cheaper ways to skin a cat.

If your signal never gets to the front end of the set, it can't cause trouble.

And a wavetrap will keep it out.

You don't have to mess with a batch of coil and condensers, either. Not in the *vhf* range A quarter-wave length of 300-ohm twinlead open at its end, will do the trick.

As an example, I'll put my installation u as one of the toughest to lick you could com across.

Running 75 watts AM on 50 *mc*, the four element Yagi is less than 20 feet from m neighbor's TV antenna, and at the same altitude.

Naturally, my carrier wiped her screen clear leaving her nothing but bars to see.

The twinlead trap, however, took out virtually all interference, even with my beam pointin squarely at her antenna. Some grain was stil noticeable, but reception was excellent.

With my beam turned to its normal operating positions, the neighbor can't even tell whe I'm on the air now.

From here on in, the how-to-make-it is fo the six-meter boys. Two-meter men will hav to scale down the plans.

On 50 *mc*, proper length for the twinlead trap will be about 48 inches. I strongly recommend cutting a 50-inch length of the stuff and taking wire-cutters along when you install

[*Continued on page 59*]

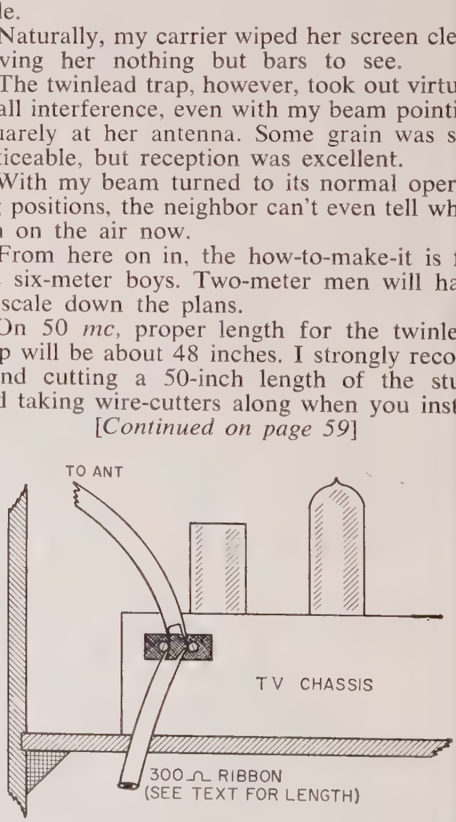


Fig. 1—The simple connections for twin lead traps. How to find correct length is described in text.

Accurate 30-60 Mc. Measurements With The SW Receiver

Joe A. Rolf, K5JOK
Box 594
Jonseboro, Ark.

In recent years the grid-dip meter has beome a popular and widely used piece of equipient in both the ham shack and service shop. his instrument, however, with its many uses, roves to be only a mediocre performer in the alibration of equipment, particularly above mc.

At 30 mc and above the grid-dipper may be much as 5-10% inaccurate. Such inacuracy is inherent in the instrument itself, due sharp non-linear tuning, crowded dial caliration, and initial alignment without a suitble standard. While the grid-dip meter is most ften called upon to give only an approximaon of frequency; it is often desirable to tune uipment to a specific frequency with small ror. Below 30 mc a communication receiver ually insures passable accuracy, but beyond coverage the builder is often forced to rely the grid-dipper in the absence of more elabate equipment.

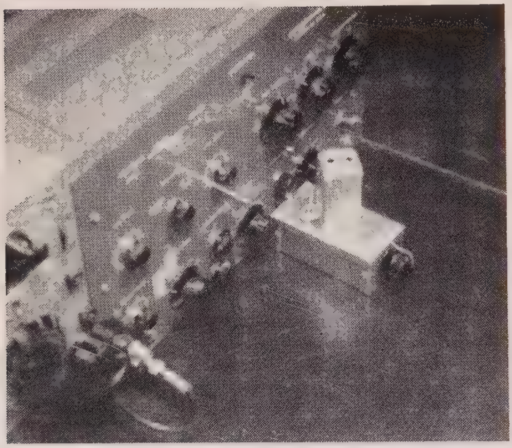
Recently, a six meter converter, in which the cillator was to be tuned to a fixed frequency 48.5 mc, proved impossible to tune properly th a commercial grid-dip meter. The instruent, at best, was only 6% accurate at 48 c, or about 3 mc off. Since the exact freuency setting was desired to give correct dial adings on a tunable *if* system, a more accute method of setting the oscillator frequency as needed. The communication receiver with ich the converter was to be used was finally ployed for this purpose.

The local oscillator of the receiver, which as reasonably well aligned, was tuned 455 kc ove the mixer, as is the usual practice. The cal oscillator beating with the converter osciltor created a heterodyne which was receivable th the receiver at some point within its covage. By using the formula $F1 = 2F2 + \textit{if}$, it was found that by setting the receiver at 24 mc, the local oscillator was tuned to 24.455 mc. At this setting, and the converter oscillator tuned to 48.455 mc, a 24 mc heterodyne would be produced which could be received by the receiver. The converter frequency would be within 45 kc, of the desired setting of 48.5 mc, or within .09% accuracy. In the above formula, F1 is the frequency to be measured at some point within twice the communication receiver's coverage, F2 the frequency at which the heterodyne is heard, and *if* the receiver Intermediate Frequency.

In measuring frequencies with a communication receiver in this way, the accuracy will not actually approach .09% due to the receiver bandwidth and slight misalignment of the local oscillator and *if* sections. Greatest accuracy can be obtained by using the receiver's crystal filter and S-Meter.

The short wave receiver is useful in this method only with frequency generating devices but general practice is to tune *rf* and mixer stages for optimum gain in most equipment, making alignment relatively easy once the oscillator frequency has been set. Above twice the receiver's coverage, the heterodyne will not be tunable and it is necessary to employ an external oscillator which will create a tunable heterodyne. The grid-dipper can be set on frequency with the receiver and its signal used to produce the heterodyne. Care must be taken when using an external oscillator in conjunction with the receiver to tune the correct heterodyne, as a number of beat frequencies will be produced within the receiver's coverage. Within its limitations, however, using the receiver by itself is the most available means of obtaining reliable frequency measurements in the 30 to 60 mc range. ■

Frequency Stabilization of an SSB Transmitter for Net Operatio



Ed Piller, W2KP
157-32 20th Ave.
Whitestone 57, N. Y.

For accurate net operation, an SSB transmitter must maintain its frequency within plus or minus 50 cycles of the desired frequency. One of the most bothersome practices encountered within the amateur bands and on the MARS frequencies is to hear an SSB net conducted with stations calling in up to 500 cycles or more apart in frequency. There should be no need to retune a receiver during the entire operation of a net.

During the conduct of the First Army MARS SSB Technical Net, the writer had occasion to note that the worst offenders in this respect were those stations which were using a BC-458 as the frequency determining oscillator. The BC-458 can be a stable oscillator, however
a warmup time of up to three quarters of
hour or more is usually necessary.

This drift problem was overcome by the u
of a circuit whose frequency is primarily co
trolled by a crystal. The use of an auxilia
tuned circuit with this crystal, permits pulli
the crystal frequency plus or minus two kc
the desired output frequency. The stability
within 10 cps for over an hour at a time, aft
an initial warmup of only thirty seconds.

The unit is designed to plug into the cryst
socket of the Central Electronics 20A (also 1
or 10B) exciter. An additional ¼ inch hole
drilled into the panel of the 20A to recei
a Johnson type 108-740 banana jack which
used for grounding the crystal tuning unit.

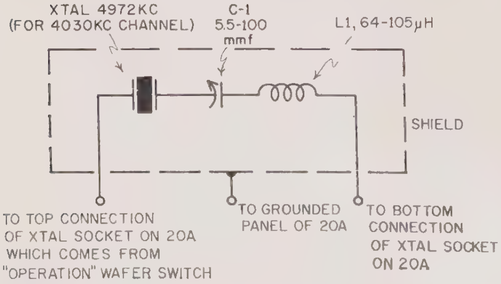
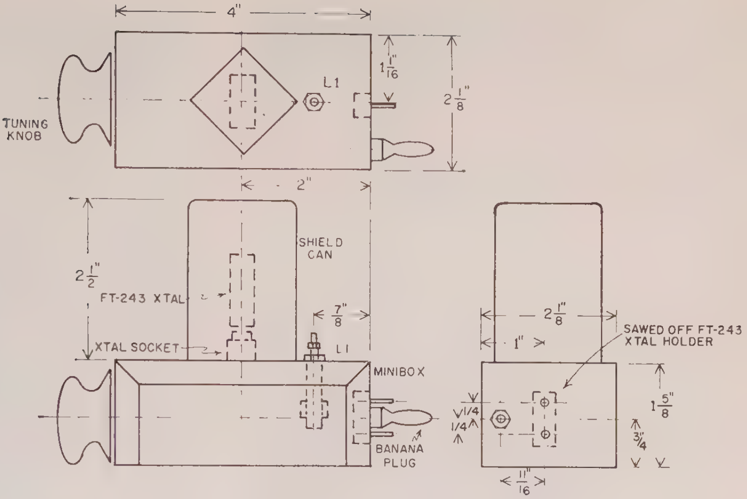


Fig. 1—Schematic of the crystal tuning device.

Parts List

C1 –Capacitor, variable, 5.5 to 100 mmfd, Hammarl
type APC-100 with ¼ inch shaft.
L1 –Inductance, adjustable, 64 to 105 microhenries, No
Hills #120-G.
1—Minibox, aluminum, size 4" x 2⅛" x 1⅝",
#29337.
1 Crystal socket for FT-243 crystal, Millen #33102.
1 Shield can, aluminum, 1¼" x 1¼" x 2" high.
1 Crystal holder, type FT-243.
3 Banana plugs, Johnson 108-750.
3 Banana jacks, Johnson 108-740.
2 Right angle brackets ½" (used for mounting ban
plugs to crystal shield can).
1—Right angle bracket as required to mount C-1.
1—Shaft extender, bakelite for ¼" shaft, ICA #211
1—Knob, bakelite, 1½" dia.



j. 2—The mechanical tails of the frequency stabilizer.

Figure 1 shows the basic schematic circuit the crystal tuning device. The constants are own for use on 4030 kc. However, the same nstants with different crystal frequencies and her adjustments of L1 can be used at the high d of the 75 meter band and on the MARS equencies of 4020 kc and 4025 kc. Values L1 for other frequencies must be determined perimentally by the builder. The frequency viation of this unit can be made to be more an 4 kc. However, as the deviation increases e frequency stability decreases and hand ca- city effects become more noticeable. Also, in- easing the crystal pulling can cause unstable oding conditions with some crystals.

The entire tuned circuit and crystal must be ielded otherwise hand capacity will be bother- ne and *rf* feedback might result. The shaft C1 must be brought out to the tuning knob ough a bakelite shaft extension to eliminate nd capacity effects.

The crystals used in this unit are selected use in mixing with a 9 mc SSB signal. The quency of the 9 mc crystal should be ac- rately measured before ordering your fre- ency determining crystals. The 9 mc crystal ed in the author's 20A was found to be with- 100 cps.

This circuit will take a crystal and pull its minal frequency down. It will not raise the quency. For example, for an output fre- ency of 4030 kc, a crystal frequency of 4972 is chosen. This can be pulled down to 4968 When it is mixed with a 9 mc signal, the tput frequency can be varied from 4028 to 32 kc.

Crystals within plus or minus 0.01% (that is kc at 5 mc) of the desired frequency in -243 holders can be obtained for $1.50 ch from Texas Crystals, 8538 W. Grand Ave., ver Grove, Ill. Three crystals were obtained m them which performed very nicely in s circuit. If your crystal frequency is too high, you can lower it by rubbing a little solder on the surface. If the frequency is too low, you can raise it by grinding the blank on a flat glass plate with a pasty solution of some Ajax cleanser in water. Moving the crystal more than plus or minus 10 kc with these methods is not recommended unless one is skilled in the art.

Construction

Figure 2 shows the mechanical layout of the unit. The entire circuit is built in a minibox 4″ x 2⅛″ x 1⅝″ (ICA No. 29337 or equivalent). C1 is mounted with a small right angle bracket. An FT-243 crystal holder was cut down ¼″ above the prongs and mounted at the back of the minibox. This is used as the connector for plugging into the crystal socket of the 20A. A banana plug, Johnson type 108-750, was also mounted on the back of the minibox for grounding the assembly. No. 6 spacer washers were used in order to bring the banana plug out an extra ⅛ inch to flush it up with the jack on the panel of the 20A. A shield can from an old ac-dc *if* transformer (size 1¼″ x 1¼″ x 2½″) was used for shielding the crystal. It can be permanently mounted with spade lugs or put on with banana plugs, if the builder desires to change crystals.

L1 is adjusted as follows: Set C1 at minimum capacity and note the output frequency (assume it is 4028 kc with the crystal used). Now set C1 for maximum capacity and adjust L1 for an output frequency of 4032 kc. With C1 back at minimum, little change will be noted in the 4028 kc setting. The inductance required for 4030 kc output was found to be 86 microhenries.

Two of these units have been built to cover the channels on which SSB net operation is desired. They have performed satisfactorily for almost a year. ■

QUICKIE TOWER

Fred Weslager, W3NVS
2002 Altmar St.
Pittsburgh 26, Penna.

Recently my son W3KYN and I decided that since we liked operating on the ten meter band so well we should have that dream of all city dwelling hams, a beam.

Unfortunately we were faced with the same dilemma most other fellows have that live in a closely knit suburban area, that of space and appearance. Our lot is only 55 feet wide and 115 feet long, with neighbors on both sides as well as behind us. We didn't want any guy wires or unusually heavy supports, but still we wanted to have a beam at a reasonably good height for effectiveness while retaining good looks and low cost. We didn't want the beam to be too far from the house in order to reduce the length of the feed and control lines. Also, on orders from the xyl, "No beams on the house."

Sounds like quite a task, doesnt' it? Well, the following will be a short summation of our efforts.

The beam we selected was a Cush-Craft 3 element job with a boom length of 10 feet and the longest element 17 feet 2 inches with a total weight of about 11 pounds.

We checked around and found that an Alliance rotator, Model U-98 would more than handle the weight as well as give us a directional indicator control for a minimum cost.

We had the beam—now to get something to put it up on!!!

We secured some 2 x 4's and made a saddle support as shown in fig. 1.

We then dug a hole in the ground deep and wide enough to bury a regular sized wooden barrel one foot below the level of the lawn. Then we took the 2 x 4 assembly, temporarily guyed it plumb, and filled the barrel with dampened dirt, tamping frequently to assure solidity around the mast. We did this until the barrel was full to the top. Then we nailed 3 feet long cross pieces on the mast, resting along the top edge of the barrel as well as reaching out over onto solid ground, and then covered the whole thing with dirt and tamping as we went along. We then removed the guys, and by golly we had a really strong, rigid and neat looking mast.

We then took a 20 feet long length of 1¼″ pipe, reduced it to 1″ and added on a 5 feet length of 1″ pipe. At a point approximately 7 feet from the end of the 1¼″ pipe, we drilled a ⅝″ hole and at a point approximately 7 feet up on the 2 x 4's we drilled a ⅝″ hole straight through. Then, after lifting the pipe in place we passed a ⅝″ bolt completely through an secured it.

After raising the far end of the pipe mas onto a 6′ ladder, we attached the rotator an beam and control lines. After the "meat" en of the assembly was completed, three of us by pulling down on the extending 7′ length o the mast very easily swiveled the mast up i the air and drove the pipe in between th 2 x 4's. We drilled a ¼″ hole at the base o the assembly about two feet from the groun and passed through a ¼″ bolt and bolted th whole business into place.

So far this setup has withstood moderat winds without guying of any kind and has jus a perceptible amount of swaying.

It has a nice clean cut appearance and so fa has drawn no objections from either the neighbors or—and this is important—the xyl !!! And —so far, no TVI. ■

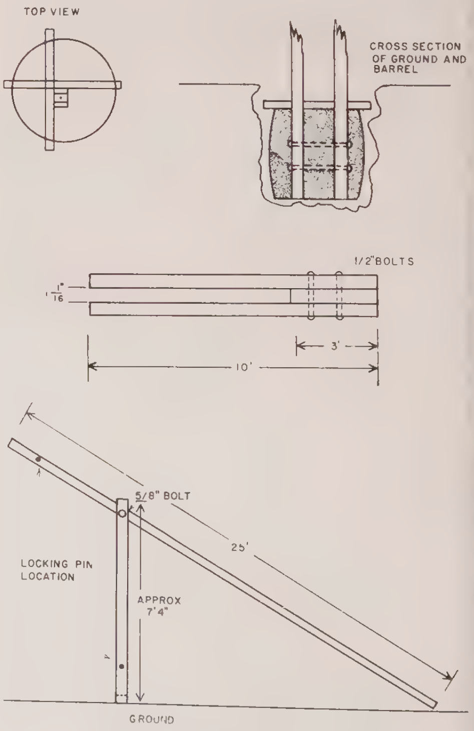
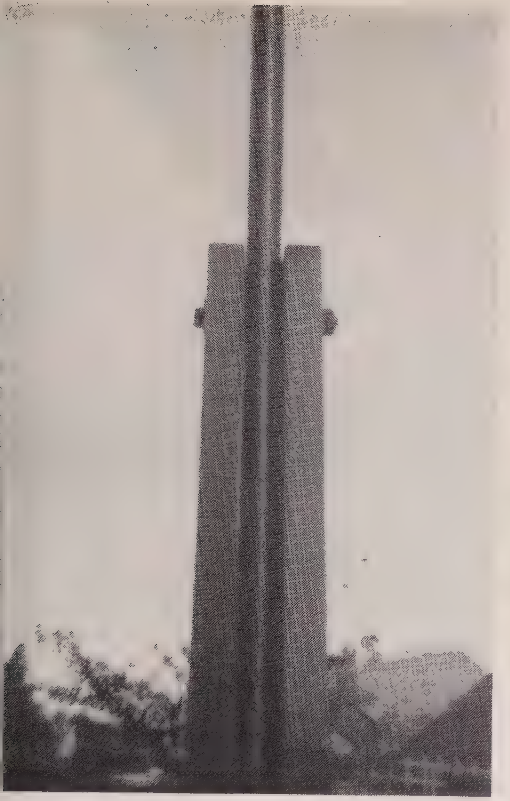


Fig. 1—Construction details for the Quickie Tower.



RAPS [*from page 51*]

e trap at the TV set.

Hook one end to the set's terminals in paral- with the present antenna lead, and enlist accomplice to operate your station.

With the beam turned to present the most terference, start trimming off the free end the trap to get as clean a picture as possible. Warning—go slow with the trimming! Steps about ⅛ inch at a time are about right. And tch out for effects of hand capacity. Take a off, drape the lead behind the set, check e picture, then take another bite if it needs it. Anyhow, you'll probably trim ⅛ inch too ch off before finding out you had it right. at won't make much difference, though.

Reception of fringe-area TV signals is not ected by the trap, which tunes sharply to ur frequency, give or take a few kilocycles. This feature, plus the lack of having to tear o the set itself—which the TV owner under- ndably might object to—makes the trap a rfect solution to the problem.

Simple, no? Inexpensive, quick, but price- s in building a good-neighbor policy and ntinuing your own existence as a ham–Try and we'll see you on six. ■

is system works fine. For two meters I use ½" of twinlead. See editorial, July, 1956, ge 12.

60 KC. [*from page 51*]

precisely measure the time between events which happen in relatively short intervals, for example, in measuring the velocity of rapidly moving waves or objects.

Several investigators, among them Professor J. A. Pierce at Harvard University, have shown that for frequencies below 100 kc/s and for distances of 5000 km and greater it requires only about 10 minutes to compare local frequencies with standard frequency transmissions to within 1 part in 10^9. This is an improvement of more than 100 over what can be obtained at HF. Professor Pierce has carefully determined that a high-accuracy standard frequency service can be given for all the world on a single very low frequency from a single high-power transmitting station.[1]

The experimental broadcast on 60 kc, although on low power, has already presented several intriguing possibilities. With the cooperation of Professor Pierce, it has been possible to compare the NBS primary frequency standard, broadcast on 60 kc, with the British standard which is broadcast on 16 kc and 60 kc, to an accuracy of comparison which is better than two parts in one billion. This has been done almost continuously since the broadcasts began last July. Regular measurements on the 60 kc broadcasts are now being made by several organizations in the eastern United States.

The most challenging project will be an attempt to compare the Boulder Laboratories' atomic-frequency standard which is much more stable than 1 part in 10^{11} with those in England and elsewhere. This will be undertaken as soon as possible. It is estimated that an accuracy of comparison of better than one part in one billion can be attained.

Tests with the experimental low-frequency standard broadcast will provide information not only on the ultimate stability of the received waves, but on possible ways of improving the standard frequency broadcast services. A high-power VLF station would be very expensive but probably less so than a network of HF or VHF stations which would be needed to give a frequency and phase standard of high accuracy at all times and places on the earth. ■

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[1] Intercontinental Frequency Comparison by VLF Radio Transmission, (Proc. IRE, Special VLF issue to be published in 1957).

LETTERS *[from page 9]*

Next I found out about previous DX-peditions to Andorra, both planned and completed. I then got off two hot letters, just as hot as the other two, one to France and the other to Canada and low and behold received fast answers to both. (Guess the postal people had a good fire extinguisher handy). Anyway, F8FC answered immediately and told me to write to the Prefet of Perpignan in France who controlled the license for Andorra. I got off a letter the same day to the Prefet and with crossed fingers waited hopefully. In case someone is now wondering how I was sending all these letters to France and hoping that they would be understood, let me point out that the XYL is from Paris, no not Paris, Texas, Paris, France. Anyway, after weeks of weakly waiting, (it's hard to eat with fingers crossed) I received an answer from the Prefet stating that all he wanted was just a little more information, such as, date and place of birth, job, address in France (XYL comes through again), etc. and he also assured me that there was no sweat for the license. I answered his letter the same day and was on top of the world. Then after a few more weeks I received the long awaited letter, I thought, with shaking hands I opened it and could not believe my ears, the XYL was translating, it was a rejection. Believe me, now I know how the boys that write all the unprinted articles for CQ feel when they get the rejection slips. Maybe even more so. Well anyway, just thought I'd drop a line to let everyone know what happened to that %#"*@¢ CN8IU that said he would be in Andorra in December. Say, come to think of it, Monaco is rather rare DX also isn't it. It's not too far out of the way and wonder what happened to that letter I wrote to 3A2AS the first of September about a 3A2 license. Guess I'd better get follow up action on the way, well here goes another hot letter. . . .

T/Sgt Alvin E. Pittman
HQ 316th Air Division
APO 118, New York, N. Y.

PS: Anyone who wants to let me cry on their shoulder can find me on 15 with my clean? AM signal or my mixed up SSB signal any night.

QSO Record

Dear Wayne:

At 07:00 hrs. E.S.T. November 2nd, K2RHH, Rob McNichols, Jr., and K2MUB, Mario Rotondo, est lished a 35 hr. record continuous QSO on 6 meters.

The previous reported record was 32 hrs. 20 min.

73's
Robert McNichols (S
K2TWN

C-161 Coils

Dear Sir:

I wish to compliment the two fine gentlemen w wrote the articles on "Hybrid-Husbandry" in Novemb 1957 and September, 1958 issues. In the event yo readers are having trouble finding the C-161 type co mentioned in the text of both articles, I have manag to get the address of a distributor for the same af much wasted effort trying to procure them through local Signal Corps Detachment and MARS Radio stati here on post. They are known as "Repeating coils #77 type C-161" for the cost of $2.00 each, lots of 10 more @ $1.75 available through Loris Sales, P.O. B 1896 E. 907 Second Street, Sacramento, California, F.O thereat. I arrived at this address through one of telephone companies at a nearby town. Possibly yo readers might try to get some the same way.

Once again, let me say I enjoy all of "CQ" especia the smaller construction articles and KEEP UP TH GOOD WORK.

"Jeff" James
Fort Rucker, Alaba

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☛ CQ ☚

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New York 36, New York

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4 Read Avidly
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1 Echh!

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______DX News
______Overseas Echoes
______VHF News

______Contest Calendar
______YL News
______Surplus Conversions
______Novice News
______Ham Clinic
______MARS News

Articles on

______DXpeditions
______New Products
______Complex Theory

______Antennas
______Receivers
______Simple Theory

______Printed Circuits
______Mobile Equipment
______Modifications of Commercial Equipment

Other messages for the editor:____

____

CQ is preparing to publish a list of all of the am clubs that are active in the world. In order o make this complete we must ask that every eader that belongs to a ham club make sure that e have the necessary information as soon as possible. Please fill in the below form or have an official of your club fill it in. Duplication won't hurt near as much as forgetting to do it. This list will help fellow hams in your area to get in touch with and join your club.

Hams Unlimited

RETURN TO
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300 West 43 St.
New York 36, N. Y.

Name of Club..

Area Served by club..

Mailing address..

....

Number of members..................**Incorporated?** **ARRL Affiliated?**

Have you a working club station?...

Any club emergency vehicles?..

Meeting schedule..

Meeting place...

VHF

by Sam Harris, W1F

P.O. Box 2502, Medfield, Ma

50mc. 144mc. 220mc. 420mc. and above

Boy!! What a relief! HOY finally got her forty-ninth state. Now maybe I can get back on two meters and see if I can catch up with some of you pros. Looks like a guy can't take any time off at all. Always somebody in there pitching. Speaking of pitching, I heard old Mel (W1DEI) got his number forty-nine with Louis (W7ACD). (Don't know if Louie got Vermont and New Hampshire but he was sure trying.)

Varactors and Such

Latest good news on varactors is that they are now available. It's true they can't be bought at the corner radio store but they can be bought. Latest price I have heard is thirty-five dollars the each. As this represents a drop from somewhere in the two hundred dollar region in the last few months, it would seem that somebody must be making them.

One thing is for sure. I have been using them. Last amplifier was at 1296 *mc*. Noise figure in the first model was slightly in excess of one *db*. The 1296 converter was the W1OOP, W1WID job which appeared in "CQ".

One of the uses of the varactor which has been passed over, is its ability to generate harmonics. In an effort to try them out as such, I hooked one of them up to the output of my Gonset vfo. The output was tuned with a coax tank tuned to 432 *mc*. With an antenna connected to the output of the tank we managed a ten mile contact with W1OOP. Later efforts included a reluctance mike hooked across the input end of the varactor. Resu was good amplitude modulation. Looks like natural for UHF xtal controlled walky talk

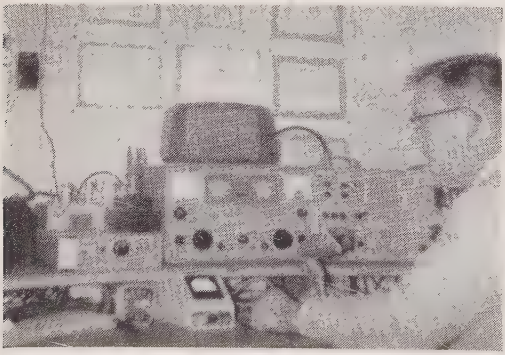
Six Meter Century Club

Finally got the certificates up to date f six (for all the other bands too). Haven't g the plaques out as of today. Seems like t shoemaker who purports to be making the has more excuses than time. I know that you have one coming, you must feel me about it, but I hope you will bear with us.

So far the score stands at 272 six met certificates and 19 for two meters. (Nobod has got one on 220 yet.)

Converters

I do not generally like to comment on commercial items in the column. However, think it would be a dis-service not to mentic the "Filter King" six meter converter. (Se Dec. CQ p. 52) I have been trying one o for the last month and can honestly say th it is the best commercial six meter convert I have ever seen or heard of. It is the on converter which can be operated in a chann two area without a filter in front of it. M only point is if Paul (W6BAZ) can do it wh can't everybody? I don't know the price, (can afford one myself), but maybe Paul will l us publish the diagram and we can all mak our own and he can go broke. After all h has WAC and WAS and CCC on six meter What else could a guy want? (A Plaque maybe



So this is what Tulsa, Oklahoma looks like! It's Les, (W5IPY) winner of the Oklahoma section in the August "CQ" VHF contest.

Thought you might like to know what the many time winner from Connecticut looks like. He did it again of course in August. Oh yes, it's Stew Banks, K1CRQ.

x Meters

It's doing it again; and even better this year an last year. Six meters that is.

Six meters was first open to Europe on ctober 14th this year. No contacts were made ı that day but on October 19th EI2W and 2RRG made the first contact across the tlantic for this season on six meters. The st cross-band contact (6 and 10) was made ı October 16th.

Harry (EI2W) already has picked up a new ate on six meters with a West Virginia conct. This makes state number thirty-five for arry.

About November 4th, the band really started ting up. From the east coast it was open to e west coast just about every day. According our own records the 14th, 15th and 16th of ovember were about the best experienced in dio history for six meters. EI2W, CT1CO, d CT3AE were heard daily and a few SM's d others thrown in for good measure. Also ard for the first time on the east coast were E1JN, ZE2JE and ZE3JJ. These boys were aking contacts with 1's, 2's, 3's, 4's and 8's. e heard a W7 calling one of the ZE's but ver did hear if the contact was made. Bill, 1ELP, was the only W1 to make a clean eep of the ZE boys that morning (November th).

On these same days W1's were hearing and rking stations in California, Washington, egon, Nevada, Utah, *Idaho, New Mexico,* itish Columbia, Alberta, and Alaska. VE6UV d VE6FN seem to be the six meter boys from berta.

Ike, the best-known VE7 on six meters E7AQQ) has finished working all JA discts this season. He's waiting only to receive cards from JA9 and JA0 to get his certifie; the first one issued for six meter operan. Ike also reports a JA XYL now operating meters. Her call—JA1AEQ.

Among the many strange calls heard by this season are the following: KX6BQ, ho worked several 6's and 7's besides Ike), 2HA, KR?, VU?, DU4?V, HO2HK. We y get those fellows yet here on the east st; the way six is acting up I wouldn't dict a thing, but ----! ! ! ! He also heard SFW working JA7IF, which makes WAC "Slew Foot Willy".

On the 4th and 5th of November Japan s coming into W6 land for hours at a time. the 5th the JAs began coming in at 1400 l were in until 1830. ZL's were into W6 d for two and a half hours during this ne period. I'm telling you six meters has ne absolutely crazy. Of course KH land s also in there with the ZL's and the JA's. metimes I think seriously of moving to west coast.

W7CIO reported a Mozambique station ırd in W7 land on the 13th of November. W7DMN worked Southern Rhodesia (ZE) on the 14th. Bob (W7CIO) also reported hearing east coast stations, KH6's and JA's at the same time. W7RT worked Brazil and Argentina on phone in the middle of these queer openings.

Guess the answer to the whole deal of just who you'll work on six meters these days is to point your beam in any odd direction, give a few "CQ's" and then listen like mad. If you're pointed at South America you just might work the North Pole. Who knows?????

Letters

Lisbon, Portugal Manuel Antunes, CT1CO, has sent us a bit of information concerning his activities on six meters.

"Due to various circumstances, my rig is still in the 40-watt level and I wonder whether I should increase power to 300 or 400 watts. As you no doubt know, the end of this year is also the end of CT operation on 6 . . . unless we get an extension."

"It may interest you to know that I have already contacted a few American hams this season. My first QSO this season was with W1HDQ, the first of November at about 0800 EST. I contacted Ed the following day at about the same time. I had already been heard the 18th of October by Riley Sundstrom of Stockton, N.J., as well as by W1HDQ. Incidentally, the 18th of October was the first day I made beacon transmissions in your direction and at the right time, so I regret having not started a few days earlier."

"I have been transmitting in other directions and at different times for the past six or seven months and have been heard in Argentina, South Africa, Italy, Germany, Sweden, Switzerland, France and England, but so far I have been able to QSO ZS3G and a ZE only."

"So far I have been transmitting on 50.1 *mc* but a few weeks ago I received a crystal for 50.004 *mc* from W6NLZ of KH6-W6 144 *mc* QSO fame, and I am now putting it to good use. Please look for my signals on the lower edge of the band. (Incidentally, I contacted W6NLZ this afternoon and gave 50 *mc* WAC to him.)"

"It may interest you to know that during the 1957-58 season I managed to QSO about 90 Ws in 20 states, sixteen of which have been confirmed. I also contacted a few VEs and hope to contact many more this coming winter."

"I am using a 5894 on the P.A. and my receiver is an old HRO with a home built converter. My antenna was a dipole strung between two window poles at about 40 feet above ground. A few months ago I added a reflector to the dipole to make a 2 element beam but it doesn't seem to give any appreciable gain. I intend to erect a 3 element rotary beam on the roof for which I have already got a rotator donated by a W6 fellow ham." *All very fine information for the gang on six meters Manuel, and we surely are hearing you just about every morning on the East Coast. Congratulations on the fine work you are doing on six meters.*

Buenos Aires, Argentina Our friend Michael, LU3DCA, sends some more news from the land of DX.

"Today (October 25) I did some operating on six meters and spoke with some of the boys in the states of Washington, Oregon, Montana, North Dakota, Nebraska, Minnesota, Kansas, Michigan and Wisconsin. Besides these, I heard other stations in Idaho, Colorado, Missouri, South Dakota, Illinois, Arizona and California. What do you say about that? *You just can't make WAS on six meters in one day. That's what I say, but I'm beginning to wonder if that's correct.* The band was open for us for three hours and we now have twenty states worked."

"September was very good for us, openings every night except on three occasions. I worked VP6PV and HK1GF for country 24 and 25 on six meters, but am still waiting for cards from HC1FS, HC1JW, TG9JW, CO2GX, ZP5EA and the one which I hope will come through soon." *Fine business Michael, congratulations on the new states and new countries. Hope to see you soon myself on six meters.*

Anchorage, Alaska One of the most frequent KL stations heard on six meters sends us the following: (Jack Reich, KL7AUV, that is.)

"Six has been super quiet around here all summer. I have aged many tubes in the converter and SP-600, leaving it boil from 0700 to 2200 or 2300 every day anyone was home. Built a new converter last month—6BS8, 6AJ4, 6CB6—with every known means of birdie and interference suppression I could think of. Made it rather sharp—will probably only work over about the bottom 500 kc, but my efforts were rewarded Friday and yesterday, October 17 and 18, when the JAs started sneaking in with much QSB and weak signals. JAs were heard from 2200 to 2300 Friday, and 2200 to 0008 Saturday."

"Margie, KL7BLL, (my XYL) worked the first one (and won't let me forget it). *Why should she?—Helen.* I worked 13 contacts with 10 different JAs on Sunday. Margie is going to have to do most of the JA work, because I can't stay away from the job more than the morning hours. I have the CAA Avionic Shop here for the Alaska Region, and things are really booming."

"We are all tuning madly for the first States Signals, with the exception of KL7CDG, who is back in the States, and June and Woody, AZJ and MS who are in Oklahoma City now." *Believe the KLs have been worked by the time this goes to press Jack and the east coast will surely be looking fer ya agin.*

Sointula, British Columbia Good ole Ike, (VE7AQQ) (and Frances the XYL) is still with us on six meters. Here's what he has to say:

"Six meters has been dead since August 17 but I monitor the band every day and am eagerly waiting for the fall openings, when I will be able to work the gang again."

"I have made a few changes to my rig. I now have an input of 135 watts and am running 185 watts of audio, using a form of ultra modulation. Reports on ten meters have been very good and am anxious to try it out on six meters."

"Ten meter DX has been unusually good this fall and if it is any indication of what we can expect on six meters, well, who knows what will happen."

"Yesterday, October 17th, I heard very faintly, JA3 phone and JA cw calls on six meters between 1800 and 1900 hours." *Gee, everyone's working stuff on six, guess I'll have to go there too. Thanks for the dope, Ike, see you on six.*

Burbank, California Remember K. J. Farnsworth, W7WLV, from Salt Lake City? Well—he's now K6BNR and located in Burbank, California, and this time sends us some devastating news.

"One of our good six meter friends here had a little bad luck here last week. You may have heard of the bad brush fire we recently had; well our friend K6GQX just north of me lost his entire ham shack in the fire. The fire burned within ten feet all around of his house and yet it did not burn, but his ham shack fifty feet away burned to the ground." *You call this a little bad luck?*

"Today, October 26, a bunch of the hams from around here went up and got him back on the air. Thanks to K6TRC, K6BLT, K6KKV, K6UMV and others, he is now back on six but only running low power for the time being."

"I'm sure that anyone who has ever worked Don, would like to send him a second QSL card as all of his were burned along with the gear."

"Guess who his last contact was with before the fire? W1HOY! It was right after that contact that he lost everything." *I just can't believe that Helen's signal would set the state of California on fire, but if you say so I'll have to believe it. C'mon gang, rally to Don's aid, at least as far as QSLs are concerned.*

Porterville, California Norma Margot (K6ZEH is getting right along with her DX.

"As you probably know, the band was open to the eas coast for about two hours this morning, November 4. finally worked Delaware, and now I believe there ar hams on six meters there."

"The most interesting part of the day came a littl while ago. As you remember, Alan and I were the firs ones to work Japan last November when the ban opened to JA land. This afternoon they came in fo the first time this year and I was first. Alan came hom about 40 minutes later only to find they had disappeared. *He will go to work I suppose!*

"I was idly turning around about 1415 and I hear ZL1DE and ZL2DS; I called and called but couldn' raise them. They faded away about ten minutes later Then I looked for Japan and lo and behold! Ther they were! I called a 'CQ' and three came back to me I was DX for a change. I was the only signal on th band they could hear—my reports were all 5 8-9 plu 10 db and I gave them 5 7-9 plus 5 db with some QSB— I have never heard such strong, lovely, wobbly signals When we worked Japan last year, we had to fight fo every word and finally had to go to cw to complet the contact. They faded out at 1500; then I tuned an tuned and sure enough, they came back in again a 1545 with 5 7-9 signals again! Alan worked one J and I worked a J8, a J7 and a J6! Earlier I ha worked three JA1s. Last year I worked JA3EK, so no I'm particular and am looking for JA4Is etc. My Japa nese is limited to 'Sayonara', so I had a rough time—. *Congratulations, Norma! It's fun isn't it? But then si meters is always fun.*

Long Beach, California Ralph Steinberg (K6GKX) sez:

"For your information, the 'Inter County Net' wa organized on September 29th. The net operates on 221. mc every Monday, Wednesday and Friday at 2000 PST As of today there are 23 member stations. I am ne control and K6OPD is emergency coordinator. We ar doing everything and anything to further interest in 220 mc." *Fine work your gang is doing Ralph. Keep i up and finally 220 mc will come into its own.*

Champaign, Illinois Bob Heil (K9EID) comes through too:

"I am here at Illinois University going to Communications school and I sure do miss all of the six mete activity. If everything goes as planned, I will have the rig here in February."

"For the interested hams who think I'm lost, my QTH for the time being is 310 East Gregory Drive Champaign, Illinois." *O.K., Bob, hope you do get th rig at school and get in on the DX, but don't neglect your studies.*

Milford, Connecticut comes through via Bo (W1UWU), who sez:

"I've been getting in on some of the east-west openings we've been having and have worked four new states plus VE7. Hrd the fellows calling Africa but just at that time the band opened up and I was busy getting 6's and 7's out of my hair. Hard to hear 7's with al the 6's in there but I managed to get five of them and those new states."

"Heard a faint signal near the end of the opening which gave call letters beginning with KA1, didn't get the entire call because of locals on the frequency. Also heard a very weak cw signal, JA, but couldn't make out any more than that."

"Been on the air since March with a 6146 running 45 watts into a five element beam atop a 48 foot tower. Receiver is an NC300 with the National converter. Have worked 27 states with 24 confirmed."

"At the present time there are eight (8) six meter operators here in Milford, with two more expected on the air soon."

73, Sam, W1FZ

VHF CONTEST RESULTS

The August CQ VHF Contest was an experiment. The object was to find out if the low power boys really wanted to win a contest. The rules were written to allow operating skill and effort be the determining factor in winning. It is interesting to note that many of the same fellows who won previous contests won again under the new rules.

High national score came from K2GLI. Steve operated six meters for all it was worth. His operating multiplier of 24 tells the story. You just have to operate a contest to win. And he did. In addition to high national and section, he wins the Achievement Plaque for over two million points. (2,400,000.) Runner up on six and top man in the New York section was K2VIX. Frank ran up 2,203,000, points for his Achievement Plaque and section award. His 184 contacts were top for single band. (W1HOY excluded.) 24 hours operating multiplier for Frank too.

K2KJI turned in a whopping 2,203,200 points for national high on two meters. Achievement Plaque and section award for Gene were the result of 24 hard working hours and 180 contacts in 51 sections. A top-notch two meter effort.

W2NKB came off second best on two meters with 1,730,520 points and the hard way with a power multiplier of 10 and an operating boogie of 24.

For good measure New Jersey threw in another 1,101,600 two meter points for the top novice score. KN2PPZ managed this score with 24 operating hours and a power multiplier of 10.

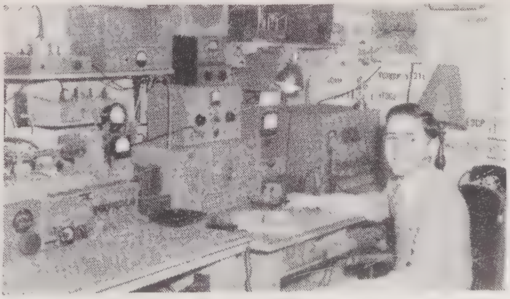
KN1IED (Conn.) won his section for novice entries with 1,069,040. 23 operating hours and a power multiplier of 10 did the trick. (Note that one lost hour cost him the national high score.)

18 stations turned in scores of over 1 million points. California (K6EHR/6), Connecticut (K1CRQ), (KN1IED) both on two meters. Indiana (K9GFQ and W9OBH), Massachusetts (W1HDS and W1EUJ), Missouri (KØQQC and KØDOK), New Jersey (K2GLI and W2SSU on six and K2KJI, W2NKB and KN2PPZ on two meters), New York (K2VIX and K2YVE/2 on two meters—K2VIX on six meters), Pennsylvania (W3JMY on six and K3BUM/3 on two meters.

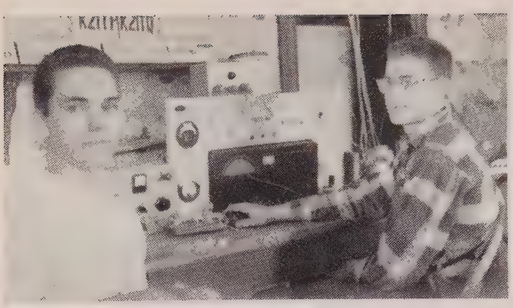
On the whole, the contest was a success in our eyes; greater participation, greater effort and more lost sleep than in any of our previous contests all helped to make it so. We had a few complaints concerning the way the multipliers were handled but comment from 90% of the gang was "WE LIKE IT!"

Gonset and a seven over seven antenna for two meters did the job for Mary Frost, W8VRH, in Michigan. Mary was top scorer, general license, on two with 17,920 points.

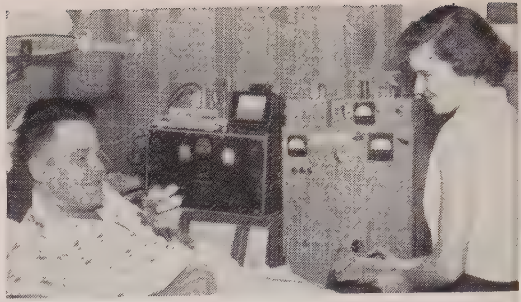
Frank Carfano, K2VIX, top scorer for New York on six meters, second in country with score of 2,208,000.



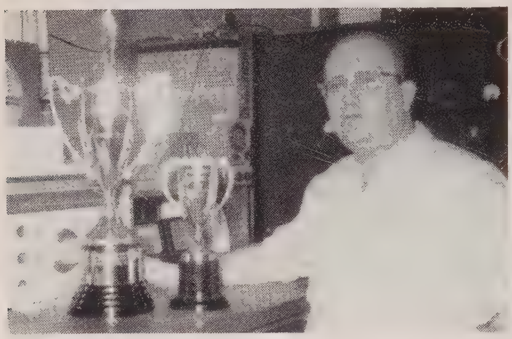
VE3DSU, Jack Emerson, won the Ontario section on six meters with score of 7,200 points.



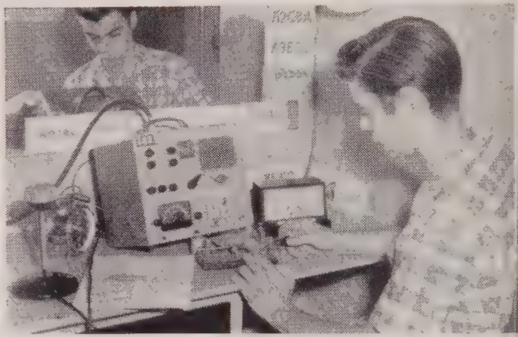
K2ITQ, Hal, on the left; K2ITP, Joe on the right; operated as a team using K2ITQ in the contest. They operated Multi-band and came up with a score of 39,552.



From the "Tonawanda New York News" we get the operating position of KN8JLC/2. Herb was top scoring Novice from New York with a score of 119,000.



W8LPD, John, with his trophies, DX cards, etc., score—Multi-band, 24,566. Large trophy—Microwave Associates; small trophy—Midwest VHF Club.



House trailers make good contest-operating spots. Ask Ray, W1HDS, top scorer on six meters in Massachusetts with 1,317,120 points, and did his contesting from this position in the trailer.

SCORES

STATION	CON-TACTS	COUN-TIES	POW.M	HRS.	SCORE	BAND
ARIZONA						
W6ASH	59	13	(5) 10	16	226,720	MULTI*
W7QLZ	8	1	10	3	480	50
ARKANSAS						
K51PL	24	19	5	8	36,480	50
K5KJE	10	7	5	9	6,300	50
K5AZH	8	4	10	5	3,200	50
CALIFORNIA						
K6EHR/6	140	18	10	24	1,209,600	50
W8NWD/6	129	15	10	24	928,800	50
W6NZV	118	17	10	23	922,760	50
K6HCP/6	164	19	5	24	747,810	50
K6DWX/6	150	6	10	23	207,000	50
K6OHS	76	6	10	18	164,160	50
K6TBS	126	6	5	20	151,200	50
K6OGU	52	13	10	11	118,720	50
K6OHD	87	5	5	18	78,300	50
K6KGF	25	10	5	11	27,500	50
K6ITZ	22	8	5	9	15,840	50
KN6RCY	54	12	10	23	298,080	144
W6ASE	59	13	(5) 10	16	226,720	144
W6DSW	44	9	10	17	134,640	144
K6RQX/6	38	12	10	13	118,560	144
KN6OVF	8	2	10	8	2,560	144
K6GPG/6	19	3	10	10	10,400	220
K6OPD	11	4	5	9	3,960	220
W6AJF	8	6	5	8	3,840	432
COLORADO						
K0JSD	18	4	5	8	5,760	50
CONNECTICUT						
K1BTD/1	40	13	5	19	98,800	50
K1AFR	48	25	1	11	26,400	50
W1KLK	26	19	5	8	16,720	50
K1DCS	9	5	5	1	1,800	50
K1CRQ	126	45	5	21	1,137,780	144
KN1HED	83	28	10	23	1,069,040	144
K1COH	101	31	1	24	150,288	144

STATION	CON-TACTS	COUN-TIES	POW.M	HRS.	SCORE	BAND
KN1DWL	38	13	10	11	108,680	14
K1DCS	35	10	10	13	91,000	14
K1DIH	37	11	10	11	89,540	14
K1AFR	56	26	1	13	37,856	14
W1WHR	13	4	10	4	4,160	14
W1NFG	11	3	10	5	3,300	14
DELAWARE						
W3LML	35	24	5	10	84,000	14
W3HWQ	10	10	10	2	4,000	14
FLORIDA						
K4PPX/4	28	3	10	12	20,160	5
K4KUY	10	1	10	7	1,400	5
GEORGIA						
K4DLE	26	14	5	14	50,960	5
K4KLD	9	6	5	3	1,620	5
ILLINOIS						
W9BOZ	66	12	5	18	142,560	5
W9EET	65	10	5	16	104,000	5
W9OOX/9	23	6	5	9	12,420	5
K9JFQ	54	7	1	14	10,584	5
K9DTB	75	10	5	10	10,500	5
K9GHW	26	8	10	9	36,440	1
KN9MYD	18	3	10	8	8,640	14
INDIANA						
K9GFQ	88	44	10	21	1,626,240	[illegible]
W9OBH	84	30	10	20	1,008,000	[illegible]
K9KSH	58	20	5	19	220,400	[illegible]
K9KFL	38	20	10	9	136,800	[illegible]
K9ADJ	75	25	1	18	67,500	[illegible]
W9RMC	31	19	5	11	64,790	[illegible]
K9IEU	25	16	5	8	32,000	[illegible]
W9MHP	29	14	5	6	24,360	[illegible]
IOWA						
K0GOW	19	3	5	10	5,700	[illegible]

STATION	CON-TACTS	COUN-TIES	POW.M	HRS.	SCORE	BAND
KENTUCKY						
K4KFO	31	8	10	10	49,600	50
LOUISIANA						
K5AEY	16	5	10	7	11,200	50
MAINE						
K1GPJ	81	25	5	17	344,250	50
W1LMZ/1	7	4	10	4	2,240	144
MARYLAND						
W3CYZ	31	14	5	12	52,080	50
K4SKR/3	18	13	10	9	42,120	50
K3ERM/3	75	36	5	24	648,000	144
MASSACHUSETTS						
W1HDS	98	28	10	24	1,317,120	50
W1EUJ	114	44	5	24	1,203,840	50
K1DIT	84	23	10	24	927,360	50
W1HOY	222	73	1	21	680,652	50
K1DIR	91	28	5	24	611,652	50
W1ZWL/1	80	31	5	21	520,800	50
KØITF/1	65	27	5	20	351,000	50
K1GGX	60	16	.5	17	163,200	50
K1BSM	47	11	10	11	113,740	50
W1EFC	27	12	10	6	38,880	50
W1PSG	57	19	10	15	324,900	144
W1AAI	60	32	5	11	211,200	144
W1BDF/1	50	19	5	13	123,500	144
W1PYM	13	9	5	8	9.360	144
MICHIGAN						
K8AKO	66	22	5	20	290,400	50
K8BGZ	39	24	5	21	196,561	50
K8ILO	40	10	5	19	76,000	50
W8UML	44	11	5	13	62,920	50
W8SWC	38	13	1	6	5,928	50
KN8LHL	20	12	5	9	21,600	144
W8VRH	16	7	10	8	17,920	144
W8LIM	6	4	5	5	1,200	144
MISSOURI						
KØQQC	116	32	10	21	1,559,040	50
KØDOK	103	33	10	19	1,291,620	50
WØLFE	16	15	5	7	16,800	144
KØDOK	14	8	5	9	10,080	144
NEW JERSEY						
K2GLI	125	41	10	24	2,460,000	50
W2SSU	110	25	10	24	1,320,000	50
K2TNW	72	22	5	20	316,800	50
K2TKR	50	13	10	17	221,000	50
K2ULR	34	13	5	11	18,620	50
WA2AKF	24	7	10	13	43,680	50
K2KJI	180	51	5	24	2,203,200	144
V2NKB	114	33	10	24	1,730,520	144
KN2PPZ	85	27	10	24	1,101,600	144
V2UUN	73	31	10	19	859,940	144
K2VJZ	74	17	10	21	528,360	144
K2YTU	54	18	10	18	349,920	144
KN2RGF	46	14	10	20	257,600	144
V2ZUL	51	19	5	16	155,040	144
V2ADE	61	31	5	5	91,550	144
V2AMJ	28	23	1	8	10,304	144
K2AXQ	14	11	5	10	15,400	220
V2DZA	14	10	5	7	9,800	220
K2ITQ	206	96			39,552	MULTI*
NEW HAMPSHIRE						
V1VEX	32	17	10	8	87,040	50
NEW MEXICO						
KN5QDF	60	1	10	8	4,800	144
K5IQA	3	1	10	5	300	144
NEW YORK						
K2VIX	184	50	5	24	2,208,000	50
V2KVA/2	66	22	10	24	696,960	50
2DBB	79	37	5	23	672,290	50
2EGP	92	27	5	22	546,480	50
2ERQ	90	28	5	19	478,800	50
2SKB/2	50	20	10	18	360,000	50
2TJY	71	29	5	17	350,030	50
2DLM	57	28	5	21	333,160	50
A2AIC	66	24	5	21	322,640	50
2VKR	69	29	5	16	320,160	50
2RHH	41	16	10	22	288,640	50
2EDL/2	52	23	10	12	287,010	50
2IXB	49	15	10	19	279,300	50
2RTU	61	24	5	16	234,240	50
2TPU	67	15	5	14	140,700	50
2EGU	34	17	5	15	86,700	50
2AIG/2	33	14	5	9	41,580	50
2YIH	18	5	10	9	16,200	50
2YVE/2	104	36	10	22	1,647,360	144
2HTH	96	33	5	16	506,880	144
2LXE	70	22	5	19	292,600	144
2RTH	41	16	10	16	209,920	144
2MBJ	66	18	5	16	190,080	144
N8JLC/2	50	7	10	17	119,000	144
2ODL/2	24	14	10	13	87,360	144
2LXC	35	6	10	12	50,400	144
N2LFB/2	19	11	10	12	50,160	144
2ZIE	35	12	5	9	37,800	144
2AIG/2	16	12	5	9	17,280	144
2MXJ	22	15	5	4	13,200	144
N2OXH	10	3	10	8	1,800	144
N8KZI/2	6	2	10	3	720	144
V2AGM	5	1	10	4	400	144
V2AGL	4	1	10	3	240	144
2TBU/2	195	60			23,400	MULTI*

STATION	CON-TACTS	COUN-TIES	POW.M	HRS.	SCORE	BAND
OHIO						
K8BRU	100	30	5	23	690,000	50
W8RKX/8	72	26	10	18	673,920	50
W8WFB/8	70	25	5	18	315,000	50
W8MVE	124	62	1	20	312,480	50
K8GNJ	58	22	5	12	280,720	50
K8COI	57	22	5	18	225,720	50
K8EXJ	120	47	1	20	225,600	50
W8IMK	55	20	5	17	187,000	50
K8CRF	31	20	10	13	161,200	50
W8VGF	51	23	5	12	141,760	50
K8KSY	53	11	5	16	93,280	50
K8JQF	39	22	5	8	72,640	50
K8KTL	33	9	5	11	32,670	50
W8ATK	37	13	5	5	24,050	50
K8BDK	26	18	1	6	5,616	60
K8AMV	7	6	10	5	4,200	50
OHIO						
KN8KTX	29	13	10	10	75,400	144
K8AIW	24	8	10	10	38,400	144
W8QVK	41	25	1	12	24,600	144
K8AEJ	15	8	10	6	14,400	144
K8COI	1	1	10	1	20	420
W8LPD	173	71			24,566	MULTI.
OKLAHOMA						
W5IPY	21	7	5	10	14,700	50
OREGON						
K7DNI	46	9	5	14	28,980	50
PENNSYLVANIA						
W3JMY/3	87	41	10	24	1,712,160	50
K3DXV	60	14	10	17	285,600	50
W3AMO	51	21	5	15	120,650	50
W3TDF	47	24	5	9	101,520	50
W3KWH	42	18	5	8	60,480	50
W3FMF/3	19	9	10	14	47,880	50
W3APR	38	7	10	7	37,240	50
W3ZMP	12	7	1	12	2,016	50
K3BUM/3	90	32	10	24	1,382,400	144
W3FEY	57	29	5	14	174,420	144
W3UX	28	22	10	8	98,560	144
W3TDF	14	11	1	4	1.232	144
RHODE ISLAND						
W1WTR	52	22	5	18	209,880	50
K1CRN	76	23	5	24	419,520	144
W1FVY/1	28	20	10	4	44.800	144
KN1DFU	34	10	5	6	20,400	144
W1AQ	15	8	10	4	9.600	144
TEXAS						
K5AKY	74	9	10	23	306,360	50
W5HOD	71	11	10	19	296,780	50
W5HOI	59	10	10	22	259,600	50
W5FEG	61	10	10	18	219,600	50
K5BDL	63	8	10	21	211,680	50
K5CER	50	9	10	20	180,000	50
K5GHR	45	7	10	22	138,600	50
K5LEP	43	10	10	13	111,800	50
K5JZI	50	5	10	20	100,000	50
K5JHR	35	8	10	13	72,800	50
K5RCZ	120	6	5	16	57,600	50
K5KVE	42	4	10	17	57,120	50
K5BLI	24	7	10	16	53,760	50
W5CGB	41	7	5	18	51,660	50
K5PCN	46	7	5	15	18,300	50
K5KWB	39	4	10	13	40,560	50
K5PDD	43	7	5	12	36,120	50
K5CDP	28	5	10	7	19,600	50
K5OML	31	4	10	7	17,360	50
W5HFS	22	5	10	6	12,900	50
K5ADV	25	4	5	7	7,000	50
W5CNJ	25	3	5	6	4,500	50
K5DCQ	18	2	10	4	2,880	50
W5TYS	11	2	10	3	1,320	50
W5TFW	6	4	5	2	480	50
W5GMA	10	3	5	1	300	50
K5GHX	5	1	10	1	100	50
SOUTH CAROLINA						
K4HEA	15	9	5	10	13,500	50
W4VIW	7	4	10	7	3,920	50
K4QIJ/4	6	3	10	2	720	50
VERMONT						
W1FMK	20	13	1	5	2,600	50
VIRGINIA						
W4YOP	20	10	5	13	26,000	50
W3MSR/4	15	10	10	4	12,000	144
WEST VIRGINIA						
K8HRO/8	48	21	5	15	151,200	50
W8KNG/8	20	10	10	10	40,000	50
WISCONSIN						
K9HUI	43	9	10	19	147,060	50
W9JFP	68	22	1	9	26,928	50
W9TQ	17	11	1	9	3,366	144
W9AJU	7	4	5	5	1,400	144
WASHINGTON						
K7AFL	31	10	5	17	52,700	50
ONTARIO, CANADA						
VE3DSU	15	12	5	4	7,200	50
VE3BHZ	54	17	5	16	146,880	144
VE3DSU	34	19	5	8	51,680	144
VE3BHW	25	13	10	6	39,000	144

SURPLUS

by KENNETH B. GRAYSON, W2HDM
110-20 71st Ave., Forest Hills 75, N. Y.

This month we had intended to revamp the BC-312 to 2, 6 and 10 meter operation. It took a pretty good (and hot) piece of gear to make us shift that conversion to next month, but we think we had better get this month's surplus out into the open. As a matter of fact, we feel so enthusiastic about this month's equipment, that we have permanently installed one in the home rig. For only five dollars you too can own a "Type 3-A Carrier Operated Loudspeaker Control Panel," brand new and complete with overseas packing.

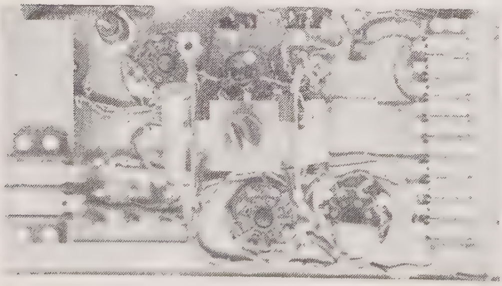
This little gem was designed to act as an auxiliary squelch . . . no signal—no sound . . . and with any receiver using *avc* (which means just about any receiver). Not only that, but it can be installed without modifying the receiver in any way beyond connecting to the *avc* circuit.

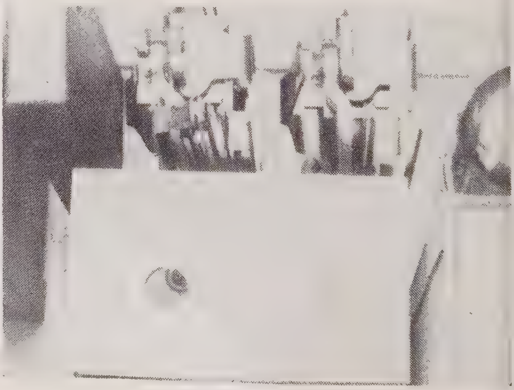
The photographs show what the panel looks like. Fig. 1 is the schematic of the panel. The panel operates by amplifying the *avc* voltage in tube VT-1 so as to control the thyratron VT-3. Noise bursts which could possibly trip the thyratron are detected by VT-2 and used to prevent accidental turn-off of the thyratron. The plate voltage of the thyratron is *ac*, but since the tube acts as a rectifier, this is OK. The thyratron is normally conducting until a *dc* voltage higher than the critical voltage is reached. The critical voltage is determined by the settings of R-7 and R-8.

When the receiver picks up a signal, *avc* voltage is developed. VT-1 amplifies this voltage and VT-3 becomes disabled or non-conducting. This causes relay RL-2 to be in a normal position. If the station should go off the air the *avc* voltage will drop to zero and the relay would then close due to current being passed by VT-3.RL-1 serves as a fail safe device. Should the panel fail to operate, the relay RL-2 would act as if there was a station on the air and therefore allow the operator to hear his loudspeaker which would normally be shorted out.

Provision is made to adjust the sensitivity of the panel by means of potentiometers R-7 and R-8. R-8 is the fine control and is located on a bracket on the back of the panel. Provision is made to relocate this potentiometer according to the installation. The equipment operates from 110 volts *ac*. Looking at the relay contacts will show that they are not designed for more than 150 *ma* of current and certainly not over 110 volts. It would be wise, therefore, to use another relay to control transmitters and other power devices. The contacts are suitable for loudspeaker control, however.

If you use this panel with an *ac-dc* type of set make sure that all of the leads are suitably insulated. A piece of coaxial cable should work very well for this application. The connections should be made with shielded wire and the coax will do the job nicely. We'd like to point out that the schematic is slightly in error. The values of R-1, R-3 and R-5 are in megohms.





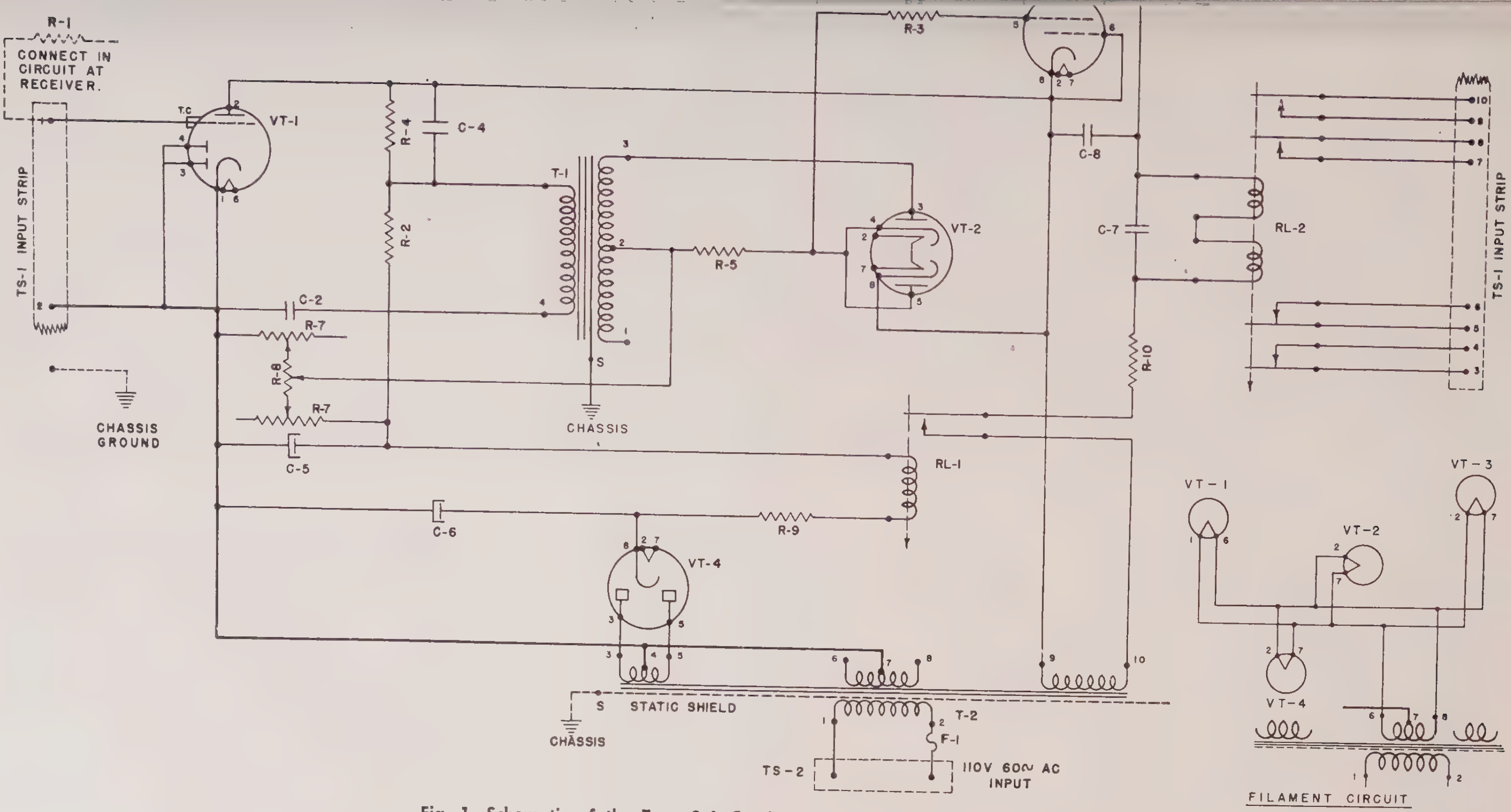


Fig. 1—Schematic of the Type 3-A Carrier Operated Speaker Control Panel.

PARTS LIST

RESISTORS
R_1 2.Ω ½ watt
R_2 25,000ω ½ watt
R_3 10.Ω ½ watt
R_4 25,000ω ½ watt
R_5 2.Ω ½ watt
R_7– 50,000ω dual control pot
R_8—10,000ω control pot.
R_9—5,000ω 1 watt
R_{10}—6000ω 10 watt

CAPACITORS
C_2– 1. mfd 500v paper
C_4– .004 mfd 600v paper
C_5 20. mfd 250v electro.
C_6 20. mfd 250v electro.
C_7– 16. mfd 150v electro.
C_8—.0005 mfd 600v mica

TRANSFORMERS
T_1 Balance input transformer
T_2– Power transformer

RELAYS
RL_1– S.P.S.T. 1000 ohm Coil
RL_2—2 make 2 break 2100 ohms total coil

TUBES
VT_1– 85 duplex-diode triode
VT_2– 6H6-GT Twin diode
VT_3– 2051 Hot-Cathode gas tetrode
VT_4—6X5-GT full-wave high-vacuum rectifier

FUSES
F_1—½ ampere fuse

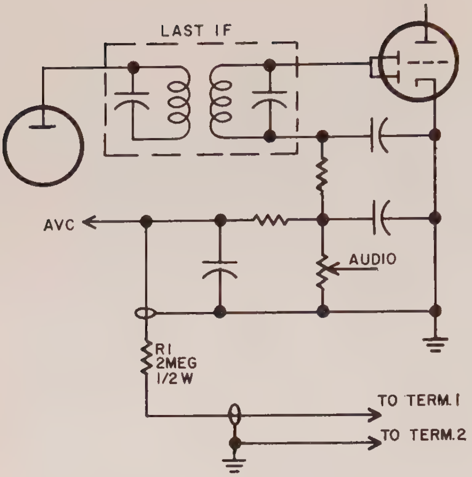


Fig. 2A—Typical avc connections.

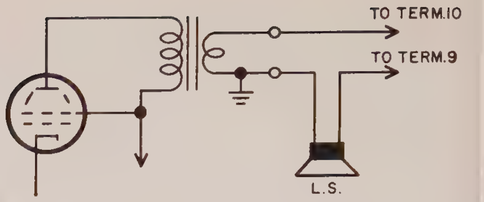


Fig. 2B—Typical speaker connections.

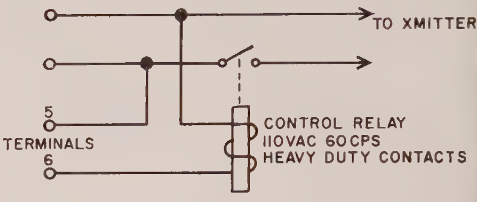


Fig. 2C—Typical Conelrad control circuit.

Several choices of contacts are available for the control of circuits. Since each installation will probably be different several examples are given in fig. 2.

The panel is quite sensitive. The minimum voltage that it would take to trip the relay circuits is about 0.2 volts. This would correspond to a pretty weak signal on the poorest of sets. The sensitivity of the panel is controlled over quite a large range by means of R-7 and R-8. It should be possible, with a tuned circuit and a diode detector, to get good control for a garage door opener. Make sure that the negative side of the detected signal goes to the grid. Many other devices are possible with the panel besides a conelrad monitor and a door opener control. With a few applications of RC (resistance-capacitance) circuits, your ingenuity is your only limit for such devices as photo-enlarger timers, time delay relays, auto calls and many, many more.

News

As you probably imagine there are many little gems like the one mentioned earlier in the column. We managed to find the Control Panel just by rambling around at Metro Electronics on Cortlandt Street, NYC; cost—a big five dollars. I still don't think they know what they have, but they will soon find out.

The handbook department is going great guns for a lot of fellows. We recently received a nice little flyer from the Japan Electronics Trading Company, CPO Box 1556, Tokyo, Japan. Seems these boys have cornered the market on military handbooks and have a pretty good catalog of them for the asking. Meshna Enterprises, 580 Lynn Street, Malden, Mass. is another lesser known surplus outfit that seems to have the CRC-7 and the BC-1335 as well as a lot of other good gear. We found out that Electronicraft Co. in Bronxville, N.Y. has spare parts for the BC-348.

Our list of handbook requests seems to grow every month. K7AWI is looking for the BC-745 horsey-talkie or pogo stick transceiver A. C. Schroeder, 1067 E. Elmwood Avenue Burbank, California is looking for the Bendix I-95 field strength meter. W9MAI wants the books on the BC-659J and the BC-1158A. K9GGV needs I-177 and TAJ-19 transmitter data K6CC needs the RBM manual. W9KLR wants info on the BC-923A while K2LEO wants DAU schematics and conversions. K6YVV go hold of an R2A/ARR-3 without a handbook while J. A. Holzenberg, c/o CAA, Iliamna Alaska wants any info on the BC-223AX.

The RDR UHF receiver is appearing more and more on surplus and K6ZCN wants to get any conversions on it that may be around KN5QJR wants to convert his BC-1333, while K9MVN reports the need of the AN/VRC-2 and GP-7 books. M. Stone, 930 Downing Street, Denver, Colorado has a BC-AO-429 and a BC-AN-430 equipment without operating instructions. R. Walters, 2425 N.E. Everett Portland, Oregon is looking for data on the ARC-4, DZ-1 and sonobuoys. VE7ALS wants an operating and maintenance handbook fo the ATS transmitter. W9LTI wants the TM 11-607 for the AN/VRC-2. John S. O'Callaghan, 8537 Skokie Blvd, Skokie, Ill. wants information on the BC-1003. W5TEW needs info on the Navy RCK receiver.

I want to thank all of the hams who have offered their handbooks for a CQ library. We haven't yet established such a library, but i it does come to be we would be most appreciative. W1YEQ was one of the many who offered assistance, but that's the ham spirit fo you. By the way, Frank Warnock, 1225 Franklin Ave, Portsmouth, Ohio is interested in converting the ID-2/APS-2 indicator, any helpers? Any manuals for Sam Dunne, c/o The Murray Tube Works, P.O. Box 476, Green Lane, Elizabeth, N.J. who is looking for the BC-AP-229, BC-191F and the BC-221-T?

73, Ken, W2HDM

PROPAGATION

by **GEORGE JACOBS, W3ASK**
607 Beacon Road, Silver Spring, Md.

January's Highlights

Continued high solar activity combined with the seasonal peak in ionization is expected to result in exceptionally good propagation conditions on both the *10 and 15 - meter* bands during the daylight hours of January and early February. On several days during the month, 6 - *meter* openings to many areas of the world are also forecast for the daylight hours. *Twenty-meters* is expected to open to almost all areas of the world shortly after sunrise, peaking during the late afternoon and early evening hours, and remaining open to some areas of the world around-the-clock. Low static levels and the long hours of darkness are expected to result in fairly good propagation conditions on the *40- meter* band from a few hours before sunset until shortly after sunrise. DX openings to many areas of the world are also forecast for *80- meters* during the night time hours.

Meteor scatter openings on the VHF bands are very likely to occur during January 1-4 when the *Quadrantids* meteor shower is scheduled to take place.

160-Meter Propagation

With longer hours of darkness, and low static levels, *160 - Meter* propagation conditions are expected to peak during January and early **February.** While DX openings on this band, at best, will be few and far between, some openings are likely to take place to several areas of the world. Skip openings of at least 1,000 miles should be possible during the hours of darkness, with some openings extending out to several thousand miles. DX conditions appear to peak on this band during the sunrise hours. This year, W1BB is again requesting reception reports for his study of *160-meter* propagation conditions. Hundreds of reports received during the past few years have helped considerably in shedding new light on the influence of the solar cycle on this lowest frequency amateur band. In connection with this propagation study, W1BB reports that this year's Transatlantic, and WorldWide "Top Band" DX tests will be held on the following Sunday mornings between 0500 and 0730 GMT.

January 4th and 18th
February 8th and 15th

During these test periods special efforts will be made to contact European, Asian, African and other *160-meter* amateurs throughout the world. Additional details concerning these test periods can be obtained directly from W1BB, 36 Pleasant Street, Winthrop, Mass.

Solar Cycle

The Zurich Solar Observatory announced monthly sunspot numbers of 204 for August, 201 for September, and 173 for October, 1958. This results in 12-month smoothed sunspot numbers (upon which the solar cycle is based) of 200.5 centered on March, 1958 and 195.7 centered on April. A smoothed number of 170 is predicted for **January, 1959**. An up to date graph of the progress of the present record-breaking sunspot cycle, and a forecast of solar activity for 1959 will appear in next month's column.

Transatlantic Moonbounce

The *European Broadcasting Union* has recently reported that *108 megacycle* signals have been submitted across the Atlantic from a scientific research center in New Jersey to the Radio-astronomy Department of the Observatory of Bonn University, Germany. This history-making experimental transmission took place during the evening of May 20th, 1958, with the moon used as a reflector. The 108 megacycle test signals were transmitted from New Jersey in the direction of the moon by means of a large parabolic mirror weighing 34 tons, with a power of 50 kilowatts. The reflected signals were measured and recorded in the Bonn receiving station without any fading and with good field strength.

Book Review

During the past few years several books on the subject of radio wave propagation have

LAST MINUTE FORECAST FOR JANUARY

Exceptionally good short wave propagation conditions are forecast for January 8th to 17th. Radio storms of moderate intensity are likely to occur between January 13-16 and 20-22, with the remainder of the month normal.

JANUARY, 1959

All Times in E. S. T.

EASTERN USA TO:

	*6/10 Meters	15 Meters	20 Meters	40/80** Meters
Western Europe	8A-12N (2)* 6A-8A (3) 8A-2P (4) 2P-4P (2)	5A-7A (3) 7A-9A (4) 9A-12N (3) 12N-4P (4) 4P-7P (2)	5A-10A (3) 10A-2P (2) 2P-5P (4) 5P-12M (3) 12M-5A (2)	4P-6P (2) 6P-2A (3) 2A-4A (2) 6P-2A (2)**
Central Europe & European USSR	8A-11A (1)* 6A-8A (2) 8A-12N (4) 12N-2P (2)	5A-7A (2) 7A-9A (3) 9A-11A (2) 11A-1P (4) 1P-4P (2)	12M-9A (2) 9A-1P (1) 1P-3P (2) 3P-12M (3)	4P-6P (2) 6P-10P (3) 10P-3A (2) 8P-2A (1)**
Eastern Mediterranean	8A-11A (1)* 6A-10A (2) 10A-12N (3) 12N-2P (2)	6A-11A (2) 11A-1P (3) 1P-3P (2)	12M-7A (2) 7A-11A (1) 11A-4P (2) 4P-12M (3)	5P-12M (2) 8P-10P (1)**
North & Central Africa	8A-1P (2)* 6A-10A (3) 10A-2P (4) 2P-4P (3) 4P-6P (2)	6A-1P (2) 1P-4P (4) 4P-6P (3) 6P-9P (2)	1A-9A (2) 9A-1P (1) 1P-3P (2) 3P-7P (4) 7P-1A (3)	5P-7P (1) 7P-3A (2) 9P-1A (1)**
South America	8A-12N (2)* 12N-3P (1)* 3P-8P (2)* 6A-10A (3) 10A-5P (4) 5P-8P (3)	5A-10A (3) 10A-2P (2) 2P-6P (4) 6P-9P (3) 9P-2A (2)	12M-8A (3) 8A-2P (1) 2P-5P (2) 5P-12M (4)	6P-4A (3) 4A-6A (2) 9P-3A (2)**
Central & South Asia	8A-11A (2) 11A-5P (1) 5P-7P (2)	5A-7A (1) 7A-12N (2) 12N-5P (1) 5P-9P (2) 9P-10P (1)	5P-11P (2) 11P-2A (1) 2A-5A (2) 5A-9A (3) 9A-12N (1)	7P-10P (1) 5A-7A (1)
Australasia	9A-11A (3) 11A-5P (2) 5P-8P (3) 8P-10P (2)	9A-11A (2) 11A-4P (1) 4P-7P (2) 7P-10P (3) 10P-12M (2)	3P-9P (2) 9P-3A (3) 3A-8A (4) 8A-10A (2)	5A-8A (2) 5A-7A (1)**
Guam & Pacific Islands	4P-6P (1)* 2P-4P (2) 4P-8P (3) 8P-10P (1)	8A-10A (2) 3P-5P (2) 5P-8P (3) 8P-11P (2)	3P-6P (2) 6P-12M (3) 12M-6A (2) 6A-8A (3) 8A-10A (1)	10P-1A (1) 5A-7A (1)
Japan & Far East	4P-6P (1)* 5P-8P (2) 8P-9P (1)	5P-8P (3) 8P-10P (2) 10P-12M (1)	4P-9P (2) 9P-2A (3) 2A-5A (2) 5A-8A (3) 8A-10A (1)	1A-7A (1)
Antarctica	9P-11P (1)	9A-5P (1) 5P-8P (2) 8P-12M (3) 12M-2A (1)	7P-9P (2) 9P-11P (3) 11P-3A (4) 3A-8A (2)	2A-6A (1)

All Times in C. S. T.

CENTRAL USA TO

	* 6/10 Meters	15 Meters	20 Meters	40/80**Meters
Western & Central Europe	8A-11A (2)* 6A-8A (3) 8A-12N (4) 12N-3P (2)	6A-8A (2) 8A-10A (3) 10A-1P (4) 1P-4P (2) 4P-6P (1)	12M-11A (2) 11A-3P (3) 3P-6P (4) 6P-12M (3)	5P-2A (2) 7P-12M (1)**
Southern Europe & N. Africa	8A-11A (2)* 6A-10A (3) 10A-2P (4) 2P-4P (2)	5A-8A (3) 8A-11A (2) 11A-3P (4) 3P-5P (2) 5P-7P (1)	7A-12N (2) 12N-2P (3) 2P-6P (4) 6P-12M (3) 12M-7A (2)	5P-2A (2) 7P-12M (1)**
Central & S. Africa	9A-1P (2)* 6A-10A (2) 10A-3P (4) 3P-5P (2) 5P-7P (1)	5A-11A (1) 11A-1P (2) 1P-5P (4) 5P-7P (3) 7P-9P (2)	12N-3P (2) 3P-8P (4) 8P-3A (3) 3A-12M (2)	6P-12M (2) 9P-12M (1)**
Eastern Mediterranean	8A-10A (1)* 6A-8A (2) 8A-10A (3) 10A-12N (2)	6A-10A (2) 10A-12N (3) 12N-2P (2) 2P-6P (1)	12M-4A (1) 4A-7A (2) 7A-12N (1) 12N-4P (2) 4P-12M (3)	6P-10P (1) 8P-10P (1)**

All Times in C. S. T. (Contd)

CENTRAL USA TO:

	*6/10 Meters	15 Meters	20 Meters	40/80** Meters
S. America	8A-12N (2)* 12N-4P (1)* 4P-7P (2)* 6A-1P (3) 1P-4P (4) 4P-7P (3) 7P-9P (2)	5A-9A (3) 9A-2P (2) 2P-6P (4) 6P-9P (3) 9P-2A (2)	1A-8A (3) 8A-2P (2) 2P-4P (3) 4P-9P (5) 9P-1A (4)	6P-4A (3) 4A-7A (2) 8P-3A (2)**
Japan & Far East	4P-6P (1)* 2P-4P (2) 4P-6P (3) 6P-8P (2) 8P-10P (1)	2P-4P (2) 4P-6P (3) 6P-8P (4) 8P-10P (3) 10P-12M (1)	1P-7P (2) 7P-2A (3) 2A-10A (2) 10A-1P (1)	12M-7A (1)
Central & S. Asia	5P-7P (1)* 7A-9A (1) 9A-12N (2) 12N-4P (1) 4P-8P (2)	8A-10A (1) 10A-2P (2) 2P-4P (1) 4P-7P (2) 7P-9P (1)	5P-9P (2) 9P-5A (1) 5A-8A (2) 8A-11A (1)	7P-10P (1) 5A-7A (1)
Hawaii	11A-3P (2)* 3P-5P (1)* 10A-2P (3) 2P-6P (4) 6P-8P (3) 8P-10P (2)	8A-3P (3) 3P-9P (4) 9P-11P (3) 11P-1A (2)	7A-3P (2) 3P-6P (3) 6P-12M (4) 12M-7A (3)	8P-8A (4) 9P-7A (3)**
Australasia	8A-11A (3) 11A-2P (2) 2P-7P (4) 7P-9P (2)	7A-10A (3) 10A-4P (2) 4P-10P (3) 10P-2A (2)	4P-8P (1) 8P-12M (2) 12M-4A (4) 4A-8A (3) 8A-10A (2)	3A-8A (3) 5A-7A (1)**
Antarctica	8P-10P (1)	6A-8A (2) 8A-2P (1) 2P-6P (2) 6P-12M (3) 12M-6A (1)	3P-6P (1) 6P-10P (2) 10P-2A (4) 2A-8A (3)	11P-5A (1)

All Times in P. S. T.

WESTERN USA TO:

	*6/10 Meters	15 Meters	20 Meters	40/80** Meters
Europe & N. Africa	8A-11A (1)* 6A-8A (2) 8A-11A (3) 11A-2P (2)	1A-6A (1) 6A-9A (2) 9A-12N (3) 12N-2P (2) 2P-4P (1)	6A-10A (2) 10A-5P (3) 5P-12M (2) 12M-6A (1)	6P-2A (2) 8P-1A (1)**
Central & S. Africa	7A-3P (1)* 6A-11A (2) 11A-4P (4) 4P-7P (2)	6A-10A (2) 10A-6P (4) 6P-9P (2) 9P-11P (1)	6A-9A (2) 9A-1P (1) 1P-4P (2) 4P-8P (3) 8P-12M (2)	5P-8P (1)
S. America	8A-12N (2)* 12N-8P (1)* 6A-1P (3) 1P-4P (4) 4P-6P (3) 6P-8P (2)	5A-8A (3) 8A-1P (2) 1P-6P (4) 6P-9P (3) 9P-2A (1)	8A-1P (1) 1P-4P (2) 4P-10P (4) 10P-2A (3) 2A-8A (2)	6P-8P (2) 8P-4P (3) 8P-1A (2)**
Guam & Pacific Islands	1P-4P (1)* 12N-2P (3) 2P-4P (2) 4P-7P (4) 7P-9P (2)	8A-11A (2) 11A-1P (3) 1P-6P (2) 6P-10P (3) 10P-8A (1)	7P-9P (2) 9P-2A (3) 2A-6A (2) 6A-9A (3) 9A-11A (1)	1A-8A (3) 2A-6A (2)**
Australasia	4P-7P (1)* 6A-8A (1) 8A-4P (3) 4P-8P (4) 8P-10P (2)	7A-12N (3) 12N-6P (1) 6P-8P (2) 8P-11P (4) 11P-2A (2)	6A-10A (3) 10A-8P (1) 8P-1A (4) 1A-6A (2)	12M-7A (3) 1A-7A (2)**
Japan, Okinawa & Far East	3P-5P (2)* 1P-3P (3) 3P-6P (4) 6P-8P (3) 8P-9P (1)	12N-4P (3) 4P-7P (4) 7P-10P (3) 10P-12M (2) 12M-12N (1)	5P-8P (2) 8P-11P (4) 11P-4A (3) 4A-12N (2) 12N-5P (1)	12M-8A (3) 1A-6A (2)**
Philippine Islands & East Indies	3P-5P (1)* 9A-11A (2) 11A-2P (1) 2P-6P (3) 6P-8P (2)	9A-12N (3) 12N-3P (2) 3P-6P (1) 6P-10P (2) 10P-2A (1)	10P-12M (2) 12M-4A (3) 4A-10A (2) 10A-12N (1)	2A-8A (1)
Malaya & S.E. Asia	4P-6P (1)* 9A-11A (2) 3P-8P (3)	9A-12N (3) 12N-3P (1) 3P-5P (3) 5P-10P (2)	12M-4A (1) 4A-7A (2) 7A-10A (3) 10A-1P (2)	4A-9A (1)

Hong Kong Macao & Formosa	3P-5P (2)* 2P-7P (3) 7P-9P (1)	1P-6P (2) 6P-9P (3) 9P-11P (2) 11P-2A (1)	9A-1P (2) 1P-7P (1) 7P-10P (3) 10P-4A (2)	1A-7A (2) 2A-6A (1)**
Central Asia	3P-5P (1)* 2P-4P (1) 4P-7P (2)	7A-9A (1) 1P-3P (1) 3P-8P (3) 8P-10P (1)	3P-5P (2) 5P-7P (3) 7P-12M (2) 12M-7A (1) 7A-9A (2)	2A-7A (2) 3A-6A (1)**

JANUARY/FEBRUARY, 1959

Q PROPAGATION CHART (SHORT SKIP)

and Aeters)	DISTANCE (MILES)			
	60-250	250-600	600-1200	1200-2400
10	Nil	11A-2P (0-1) 2P-6P(0-2)	8A-11A(1-2) 11A-3P(1-4) 3P-6P(2-3) 6P-8P(0-1)	10A-2P(1-2*) 7A-9A (2) 9A-5P(4) 5P-7P(2-4) 7P-9P(1-2)
15	Nil	9A-3P(1-3) 3P-7P(0-2)	7A-10A(2-3) 10A-5P(3-5) 5P-8P(2) 8P-10P(0-1)	6A-9A(3) 9A-3P(5-4) 3P-6P (4) 6P-8P(2-4) 8P-10P(1-2)
20	8A-10A(0-2) 10A-3P(2-4) 3P-5P(0-2)	7A-10A(2-3) 10A-3P(4-5) 3P-8P(2-3)	5A-7A (3) 7A-3P (4) 3P-7P(3-5) 7P-9P(3-4) 9P-5A(1-2)	1A-7A (3) 7A-9A (4) 9A-4P(4-3) 4P-11P(4-5) 11P-1A(2-4)
40	6A-8A(1-3) 8A-6P(4-5) 6P-8P(3-4) 8P-10P(2-3) 10P-6A(0-2)	7A-10A(3-4) 10A-4P(5-4) 4P-8P(4-5) 8P-11P(3-4) 11P-7A(2-3)	3A-9A (4) 9A-3P(3-2) 3P-5P(5-4) 5P-3A(3-5)	3P-5P(4-1) 5P-7P(5-3) 7P-5A(5-4) 5A-9A(4-3)
80	11A-4P(5-3) 4P-11P(4-5) 11P-11A(2-4)	8A-11A(4-3) 11A-4P(3-1) 4P-6P(4-2) 6P-8A (5)	3P-5P(2-1) 5P-6A(5-4) 6A-9A(3)	4P-7P(4-2) 7P-5A(4-3) 5A-9A(3-2)
160	4P-6P (3) 6P-8A (5) 8A-10A (3) 10A-4P(1-0)	4P-6P(3-2) 6P-6A (5) 6A-8A(5-2)	4P-6P(2-1) 6P-4A(5-3) 4A-8A(2-1)	4P-7P(1-0) 7P-6A(3-2) 6A-8A(1-0)

SYMBOLS FOR NUMBER OF DAYS CIRCUIT PREDICTED TO OPEN

(1) 1-4 days (2) 5-11 days (3) 12-18 days (4) 19-26 days

(5) over 26 days

* Indicates time of possible six-meter openings.
**Indicates time of possible eighty-meter openings.

On the Short-Skip Propagation Chart the first symbol in the parenthesis applies to the shorter range while the second symbol applies to the longer distance for which the forecast is made.

The CQ DX Propagation Charts are based upon a CW radiated power of 150 watts at radiation angles less than thirty degrees and are centered on the Eastern, Central and Western areas of the USA. They are valid through February 15, 1959. The Short-Skip Propagation Chart is based upon a radiated CW power of 75 watts, into a dipole antenna a half-wave length above ground. This chart is valid through March 1, 1959.

These forecasts are based upon ionospheric data published by the Central Radio Propagation Laboratory of the National Bureau Of Standards, Boulder, Colorado.

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een discussed in this column. Some have been ighly recommended for those just getting terested in this fascinating field (like "Short-ave Radio and the Ionosphere" discussed st month), while others have been recom-ended to those with a more advanced interest the subject. This month we discuss a recently blished book on radio propagation which ems to effectively bridge the gap between the ginner and the expert.

"*Wave Propagation and Antennas*" by Dr. eorge B. Welch (Professor of Physics, North-stern Univ.) was written primarily for read-s who have no more than a familiarization ith general physics. The text is designed to ovide a background knowledge of the theo-tical development of electromagnetic wave opagation, and in particular an understanding of fundamental antenna principles. Mathematical rigor, which is necessary in more advanced texts, plays a secondary role in Dr. Welch's book. Explanations of classical principles are developed through reasoning, aided at times by the use of elementary math (no more advanced than trigonometry), and often quite effectively by the use of lucid explanations and analogies.

The first three chapters of "Wave Propagation and Antennas" are devoted to explanations of what a wave is, and of wave motion. Chapter 4, with the aid of several interesting diagrams, goes through the classical explanation of reflection and refraction of waves, while Chapter 5 discusses wave interference and diffraction, including some recently developed data on "knife-edge" diffraction. Polarization is very briefly covered in Chapter 6, while skywave propagation is discussed in Chapter 7. The explanation of the ionosphere, and the important role it plays in wave propagation, while only briefly touched upon, is faily well presented. The next two chapters are devoted to an interesting presentation of antenna fundamentals, with a discussion of free space patterns, dipoles, and directional antennas. In Chapter 10, the author treats briefly what is often unfortunately omitted in other texts on this subject—the very important relationship between radio propagation and basic antenna design. Radar, forward scatter, radio-astronomy, and other timely topics are also very briefly touched upon in this chapter. The final chapter in the book is devoted to an introductory explanation of waveguides.

The book is of a suitable length (257 pages) for a comprehensive introduction to the theoretical aspects of the subject, though in many instances the material presented is by necessity rather condensed. Undoubtedly, this book will serve many readers as a useful introduction to the fascinating theories of radio wave propagation and antennas, and as a stepping stone to more advanced texts.

"Wave Propagation and Antennas" by Dr. G. B. Welch is published by V. Van Nostrand Company, Inc. N.Y.C., and can be purchased for $5.75 directly from the publishers, your favorite book dealer, or from the Radio Bookshop, 1379 East 15th Street, Brooklyn 30, N.Y.

Contest Critique—Phone

A sudden ionospheric disturbance, with an accompanying auroral display (clearly visible in Washington, D.C.) and a high frequency radio blackout began early on Friday, October 24th, and threatened to wash out the Phone Contest period. Fortunately, the storm began to subside late Friday, and was just about over when the Contest began at 0200 GMT October 25th. During the first few hours of the Contest period conditions were rather spotty, but by Saturday afternoon they improved consider-

[*Continued on page 92*]

by **DONALD L. STONER, W6TN**
P.O. Box 137, Ontario, Cal

semiconductors

A booklet titled "Circuit Applications for Diffused Silicon Regulators," published by Texas Instruments, contains an interesting circuit for speech clipping in Amateur transmitters. The speech peaks encountered in AM contain little information and add very little to the effectiveness of the system. As a matter of fact, they limit the amount of speech power delivered to the carrier. If these low energy speech peaks are clipped off, the remaining energy will have a higher average power to peak amplitude ratio.

A power zener diode has a breakdown in both directions and will clip both the negative and positive peaks. A circuit for a suitable dipper is shown in fig. 1. The zener diode should be chosen to be ½ to 1/3 the value of the peak audio input voltage. The 4.7 k resistor is used to limit the current when the diode arrives at its conduction voltage. A low pass filter follows the clipper to attenuate frequencies above 3,000 cycles, that are generated by the clipping action. The output is adjustable and as much as 20 db of clipping can be used before the intelligibility suffers.

Another interesting circuit, fig. 2, was sent in by Nathan Gold, K2AXF. It is for a four stage high gain audio amplifier that Nathan used in conjunction with the radar speedmeter project. Low cost "experimenters" transistors are used and direct coupling is used in the first three stages. Measured characteristics of the first three stages are as follows: Z_{in}—1,000 ohms, Z_{out}—2,000 ohms, Voltage gain—1,0 and noise voltage (referred to input)— microvolts RMS. The potentiometer is set f maximum gain consistent with low distortio NPN transistors can also be used in this circ if the collectors are made positive with respe to the emitters (by reversing the battery).

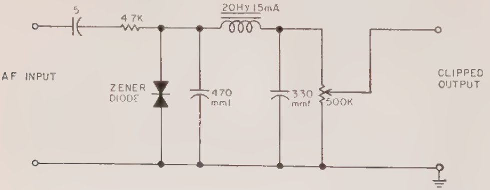


Fig. 1—Speech clipper circuit employing a power zener diode.

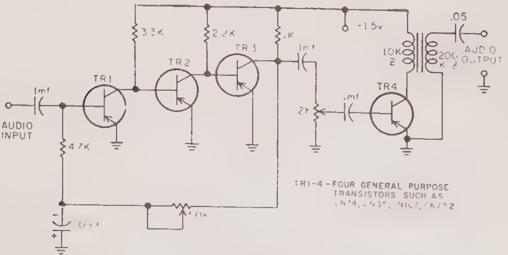


Fig. 2—High gain audio amp used with a radar speedmeter.

New Literature

General Transistor Corp. 91-27 138th P Jamaica 35, N. Y. has an excellent brochu on transistors for *rf*, *if* and radio applicatio featuring many shortwave and broadcast bar receiver circuits. Ask for brochure G-120.

Also from GT, brochure G-160 describes new line of general purpose-high quality tran istors of the germanium alloyed junction typ

Last, but not least from GT is a new br chure on germanium gold bonded diodes, lis ing the preliminary specifications on a doze new types. If interested, ask for GD-10.

As announced in this column a few mont ago, Hughes Products, Semiconductor Divisio International Airport Station, Los Angeles 4 California, is marketing a new variable capaci silicon diode. A new booklet, describing ma applications for this wondrous device, can obtained by writing for "The Hughes Silic Capacitor."

Radio Corporation of America has just pu lished a new primer on transistors. "Transist Fundamentals and Applications" contains bas information on transistor theory and circu applications, many circuit diagrams and e planatory drawings, and is designed to hel technicians and engineers understand the devices. In the last portion of the book a te includes 48 multiple choice questions base on the text. Available from all RCA distribu tors.

Semiconductor News

General Electric Company has revised i line of snap-in germanium rectifiers so th two types will replace all the selenium rectifie currently being used in radios and TV set The 1N1008 is designed for use in half-wav service, while the 1N1016 is intended fo voltage doubler applications. Both devices a rated at 380 volts PI and 130 volts RMS.

International Rectifier Corporation, 1521 Grand Avenue, El Segundo, Calif. is also mak ing universal replacement rectifiers, but wit silicon as the junction element. Called th

'Unistac TV-500," they feature forward cur- ent ratings to 750 *ma* and will deliver 130 olts dc at that current with 117 volts RMS nput, or 240 volts dc in a doubler circuit.

Also new from International Rectifier is a eries of 6 ampere stud mounted diffused unction silicon rectifiers rated from 50 to 500 IV. As shown in the accompanying photo- raph, these rectifiers are smaller than a match older.

Motorola Semiconductors, 5005 E. Mc- owell, Phoenix, Arizona have come up with nother amazing series of transistors for switch- ng and audio applications. The 2N627, 628, 29, and 630 are designed for a maximum ollector voltage of 40, 60, 80, and 100 re- pectively. All four units have a collector dis- ipation rating of 50 watts, and current rating f 10 amperes.

Pacific Semiconductors, Inc., 10451 West efferson Blvd., Culver City, Calif., have just nnounced a new line of 20 subminiature ener diodes with a power dissipation of 500 w. Three groups are rated from 2.0 volts o 145 volts. The price is reported to be about 5.00 but should drop as much as 40% about he time you read this.

Philco Corporation is making long wave- ngth infrared detectors of single crystal in- ium antimonide and "N" and "P" gold doped ermanium.

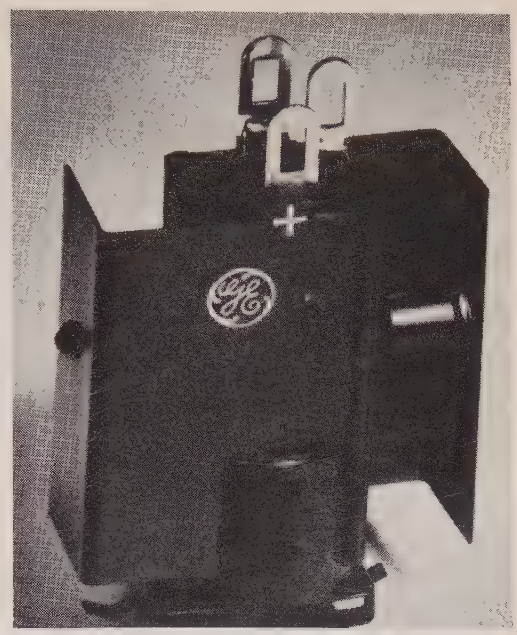
Radio Corporation of America has been warded a $3 million contract for high tem- erature semiconductor products. In addition development and production refinement of computer diode, a power rectifier, a general urpose transistor, and a power transistor, the ontract includes work on various materials nd special cases for the devices.

RCA also will be coming out with a new ne of "drift" transistors for use in an all- ansistorized *fm* receiver for battery operation. he new types are designed for use as: *rf* am- lifier, mixer, oscillator, and *if* amplifier.

New from RCA is a germanium PNP alloy nction transistor, number 2N331 and is in- nded for *af* amplifier service. The new unit as a typical power gain of 44 db, and a noise actor of 9 db. Case is a JETEC TO-9 outline.

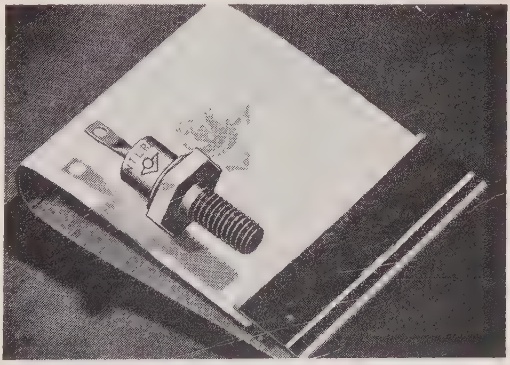
Sylvania Electric Products, Inc. have an- ounced that the first transistorized radiosonde irborne receiver is now undergoing flight tests t Wright Air Development Center, Ohio. The N/AMR-2 was developed by Sylvania Elec- ic Systems and is designed to pick up signals om the AN/AMT-6 radiosonde transmitter. he transistorized 30 *mc if* amplifier has a ne *mc* bandwidth and 80 db gain!

Sylvania is now marketing a pair of NPN edium power transistors for data processing pplications. The 2N439 is a high frequency ermanium alloy type with 30 volt collector ting at a dissipation of 100 mw. The 2N679 of similar construction but features a col- ctor voltage of 25 volts and a dissipation of 50 mw.



The General Electric series of replacement rectifiers uses germanium and are rated at 400 ma. at 117 RMS volts.

Note the small size of International Rectifier's new diffused junction silicon rectifiers. These units are rated at 6 amperes; from 50 to 500 PIV!



Texas Instruments, Inc., 6000 Lemmon Avenue, Dallas 9, Texas has just come out with a new series of low cost diffused silicon rectifiers with forward current ratings of 750 *ma*, and PIV ratings of 200, 400, and 600. These rectifiers carry JETEC numbers 1N2069, 2070, and 2071 respectively. I have had a chance to play with these units and don't hesitate to recommend them. With prices as low as 70 cents, they are destined to become mighty popular.

And with that impressive bit of news we close this department for another month.

73, Don, W6TNS

YL

by LOUISA B. SANDO, W5RZJ

212 Sombrio Drive, Santa Fe, N. M.

K5OMB, Judy Lake, 16 years old, likes to QSO other teenagers. She's a red-head, boys!

Lynette Robin, KN6UII, 13 years old. Lynette and Linda are members of the 3C's club.

Starting off with the New Year, introductions to some of the newer and younger YLs seem in order. Several teenagers are members of mother-daughter YL teams. The Camellia Capital Chirps at Sacramento boast these mother-daughter members, and wonder if any other YL club has as many: Evie, W6VHT, and Kathy, KN6ATI; Rosemary, W6PJF, and Lynette, KN6UII; Wanda, K6ENK, and Linda, KN6PBG; Ruby, K6DPM, and Lorraine, K6DPN.

Lorraine, age 15, started with a Novice in Jan. '54. She was featured in this column in CQ for Aug. '57. . . . KN6ATI, Kathy Farnum of North Highlands, is 14 years old and a sophomore in H.S. She uses a Viking Adventurer and BX-342-N and shares a 2-meter rig with her family—mother W6VHT and dad W6QPX. She likes cooking and sewing.

KN6PBG, Linda Gluck, just naturally became interested in the hobby shared by mother Wanda, K6ENK (YLRL's Editor) and father K6BNB. Most of her operating has been on 40, some on 80, with a little 2-meter phone work, but she prefers cw. The chance to work DX on 20 is inspiring her to keep studying for that General. Linda helped build her homebrew transmitter and she uses an BC-342-N receiver. Besides radio she plays the piano and sings alto in her school choral group and also sings in a quartette. 13 years old, she is an 8th grader at Fair Oaks. She has two younger brothers, and about the time this is in print will have another brother or sister (congrats, Wanda!).

Another 13-year old member of the 3C's, Lynette Robin, KN6UII, is the daughter of Rosemary, W6PJF, and W6INP. She, too, is working hard on code and theory in classes two nights a week given by W6HQY, with goal for the General exam to be during Christmas vacation. Lynette is an 8th grader at the Fremont Jr. High in Stockton. She belongs to the science club, is taking violin lessons and loves swimming, hiking, and sewing. Lynette operates both 80 & 40 cw using the family DX-100 (on low power) and joins her mother

2 meters. Lynette is waiting for her brother il, in the Air Force, to get his license so y can QSO him wherever he is stationed.

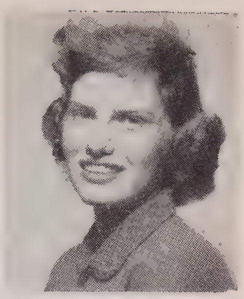
n W5-land Betsy Hargett, K5GYA, is a year old H.S. sophomore at Carlsbad, N. x. She is the daughter of Ruth, K5DAB, l K5DAA. Betsy started as a Novice in July when 13, and got her General this past nmer. K5GYA uses her TCS12 transmitter-eiver on 75 and 40, or the family Johnson) and SX-99 on all bands. Her special in-ests in Ham radio are the correct handling l fast delivery of traffic and the different s throughout the state. (Her dad is SCM N. Mex.) Other interests are her stamp lection, which she values at well over $1,000, l her work in Rainbow Girls.

udy Lake, K5OMB, at Waco, Tex. is the ighter of Mae, W5TSD, and W5TAN, and older brother is W5VIS. As Judy says, she ildn't whip them, so she had to join them. got a Tech license a year ago Dec. and itinued studying until she got her General June. The family operating table holds a obe Scout 63A, a Heathkit VFO, HQ-129X VHF-152A, all of which Judy comments n to stay "Hot." She operates 40 mostly especially enjoys the 7275 Texas Teenage . Judy is 16, a junior in H.S., and other bbies include swimming and tennis.

harlene Bryan, KN5QAK, of Oklahoma y, Okla., is the daughter of Mary, KN5PBE, W5UYG. Both mother and daughter are lying for their Generals. Charlene is 14 rs old and in the 9th grade at the U.S. nt H.S. Other interests are sports, popular sic and dancing. KN5QAK and KN5PBE k 40 meters using a Globe Scout and SX- When she gets her General, Charlene plans vork a lot of DX, and in the weather nets. family has a storm cellar in their back l where her dad sets up his DX-100 and 71 during the stormy seasons. He works n the Okla. weather net, and via telephone a the Weather Bureau and TV stations. h emergency work especially interests rlene.

at Cross, W7IKK, became interested in n radio when at age 13 she listened to an bc receiver that covered 40 and 15 meters. began studying the dits and dahs and soon ready for her Novice. Her dad knew a n lived across the street, W7TWU, and adds, "Was he surprised to find that our was not a TVI complaint but to give a an exam!" Three months later Pat took General. By this time her mother and dad Novice tickets; her dad now holds General, Their station set-up is a Viking Valiant, HRO-60 and a Tri-band beam on a 50-ft. er. W7IKK operates 20 and 15, mostly cw he likes to chase DX. She has recently ed the 100 countries mark and is working WAZ. Pat is 15, a sophomore at West tle (Wash.) H.S. and besides Ham radio she likes to swim, ski, bowl and go to football games.

KN5QAK, Charlene Bryan, age 14, is interested in emergency work.


K5GYA, Betsy Hargett, age 16, enjoys traffic handling.

W7IKK, Pat Cross, age 15, is an avid DXer. Photo by W7TWU.

KN6PBG, Linda Gluck, age 13, is interested in DX.

Cook Book for the YLs

The Cook Book with the Ham (radio) flavor, prepared by the YLs of the 3C's club at Sacramento, is now on sale. Copies are $1.75 each, postpaid. The girls have worked hard gathering, editing, printing and assembling this book of recipes that are especially nice to serve when radio friends drop in, when the YL has a contest coming up, etc. Send your order to K6ENK, Wanda Gluck, 7317 Walnut Rd., Fair Oaks, Calif.

AWTAR

Carolyn Currens, W3GTC, is radio net chairman for the AWTAR again this year. The Derby is scheduled from Lawrence, Mass. to Spokane, Wash., and W3GTC is looking for operators in these cities: Lawrence; Binghamton, N.Y.; Youngstown, Ohio; Kokomo, Ind.; W. Chicago, Ill.; Rochester, Minn.; Fargo & Bismark, N.D.; Miles City and Helena, Mont., and Spokane. Carolyn would appreciate a note from anyone who is willing to help.

[Continued on page 94]

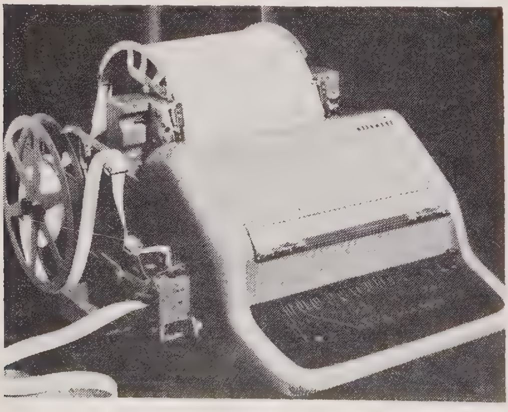
RTTY

Byron H. Kretzman, W2JTP
16 Ridge Dr., High Hills,
Huntington Station, N. Y.

Autostart, as we started to say back in the November issue, is a very attractive way of hamming, particularly if your time for such things is limited. You therefore can keep in touch without actually having to be at the machine all the time. And, you don't need a dozen relays and extra tubes to do it, either.

Fig. 1 is the Autostart Circuit. As you can readily see, it is not complicated. Fig. 2 is the Clock Unit schematic diagram from page 58 of the *RTTY Handbook*. This Clock Unit has been in use at W2JTP for several years. It plugs into octal socket S-1 shown in fig. 1. The receiver and TU plug into S-2 and the Teletype motor plugs into S-3. Relays K-1 and K-2 are 115-volt *ac* relays with ¼-inch diameter contacts.

The heart of this autostart circuit is relay K-3, which is an inexpensive *Amperite* 115-volt thermal-type time delay relay, type 115-C120, whose contacts are normally closed. This relay determines how long your equip-
ment listens to an empty channel before shu
ting everything down until the next listenin
period.



Olivetti Model T2 CN Teletypewriter. This Italian machine is distributed in this country by the TelAutograph Corporation in Los Angeles, California. The selling price is $1,900.00.

How it Works

If your clock unit is set up for, say 7 pr
the circuit between pins 3 and 4 on S-1 is the
closed for a short interval, perhaps 10 or
seconds. This closes K-1 which locks
through the normally closed contacts of th
time delay relay K-3. The contacts of K-
then apply *ac* power to the receiver and T
plugged into S-2. (The 6SQ7 is usually bui
into the TU.) If a mark tone is detected
the TU, relay K-4, an 8000-ohm Sigma 4
closes the circuit to K-2 which starts the m
chine. K-4 remains closed during mark ar
normal 22-ms space pulses, but should a lon
space or no signal be received, the 6SQ7 wi
cut off to open K-4 and K-2 and stop the ma
chine. Note that when K-2 is closed, the ci
cuit to the heater of the time delay relay K-
is opened so its contacts remain closed, kee
ing the "start" relay K-1 closed.

Should no signal be received for a perio
of about two minutes, the time delay rela
K-3 opens, causing K-1 to drop out, thereb
turning off the receiver and TU until the ne
"clock time," say 8 pm.

To explain further the operation of th
6SQ7, the cathode is biased above ground
a point where, with noise only to be receive
no plate current flows. When a mark signal
received a positive voltage is applied to th
grid to cause the tube to conduct and clo
K-4. If a space signal longer than that co
tained in the LTRS character is received, r
sistor R discharges the 1 mf capacitor whic
will make the relay drop out. (R is abo
5-megohms, but should be adjusted.)

In the original W6AEE TU, page 61 of th
RTTY Handbook, the RC circuit is return
to the cathode of the 6SQ7 instead of groun

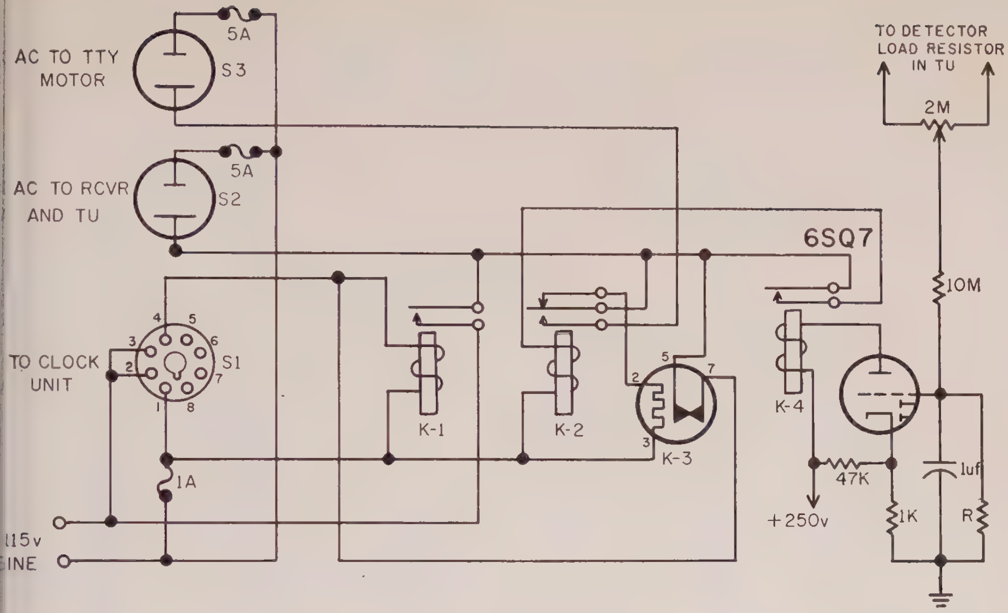


Fig. 1—Autostart Circuit

ıclty how you set up the 6SQ7 and how you ust the 2 meg pot depends upon your own circuitry. When the 6SQ7 is correctly up, K-4 will not close on anything other n a mark signal. It should not close on ɔne QRM.

Minneapolis/St. Paul

Ξarly in November, your RTTY Editor paid isit to the Twin Cities and enjoyed visiting ny shacks of the RATS. It was during this a visit was paid to WØBP, and your RTTY itor was treated to the unforgettable sight 'ole BeeP operating during an RTTY SS itest. No wonder we couldn't get a picture WØBP! No camera could possibly record at we saw; 'ole BeeP, goatee and all, hunched r his Model 28 in the pilot position, with a del 15 to the left at the empty co-pilot ition (waiting for unwary visitors, like me), h tape gear-multihead TD's and reperfs, back of him. Tapes and page copy covered possible desk and table space, and the ɔty cigar boxes were piled three foot high. ough the cloudy windows (BeeP's cigar ɔke) of the control room we could look the transmitter room where a bank of ient, tired, 872's feebly flickered. There, the power supply rack, was a huge Variac a control wheel as big as an auto steering eel. This was labled, "Volume Control." An conditioner stuck in a window buzzed in , drowned out by the mighty howl of fsk n the speaker. It was hot, and 'ole BeeP looking for number 101 on the day watch. he next evening, SS all over—with VE7KX ner, 'ole BeeP recovered enough to attend a TS dinner at the *Elks*. Also present were WØJHS, WØLFL, WØHZR, KØAKG, WØIFS, and WØHFU. A very pleasant time was had by this visitor and many thanks to the pack for their hospitality.

Hits and Bits

W1OUG has written an article on "Bell Break for RTTY." W1WEW is now back on the air from Burlington, Vermont. W1SUQ is building a W2JAV TU. W1MB is on 3620 for the Wednesday net at 7 pm.

W2TOX, 16-year-old nephew of W9GLR, is now on the East Coast RT Net on 3620, as is W2ATC and W2ORX. W2PBG has moved to Huntington, Long Island, and is back on, 40, 20, and 15.

W3LMC, off the air since getting married,

[*Continued on page 96*]

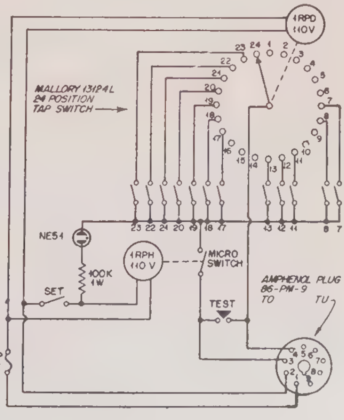


Fig. 2—Clock Unit Schematic Diagram

By: **Bob Adams, W3SW**
P. O. Box 625
Silver Spring Md.

sideband sideband sideband SIDEBAND

It has always been difficult for me to understand why so many fellows pick frequencies at the top end of twenty meters to carry on conversations with other stations located relatively near them. They are certain to be interfered with by stations calling or working DX when the band is open. When a rare one calls CQ, the DX hounds haven't time to listen on his calling frequency to see if it is clear. This procedure is standard practice and easily understandable. With most of the foreign stations operating above 14,300 the DX'er wants to get as close to the top of the band as he can to insure his being the first one the foreign station tunes to in the 'American band'. A few years ago this paid off particularly if you had a kilowatt and a good beam. Presently however, there are literally hundreds of kilowatts and good beams crowding into the top five kilocycles and calling the DX. We no longer have the offensive heterodynes covering the frequency, but ten high powered SSB stations on the same frequency can also make it impossible for any one of them to be copied.

The smart DX station desiring to work W/K stations will indicate the frequency he will listen to for answers to his CQ. This will prevent pileups on the band edge but if the station outside the band is a rare country it will not prevent the eager beavers from calling in during the contact, and creating an impossible situation. The DX station can help by adopting a policy to announce that he will QRT immediately unless the callers wait for him to complete each of his QSOs. I heard Paul, HC8LUX and Doug of FO8AT on several occasions threaten to close down if the gang continued to call in during their contacts and you'd be surprised how "good" all the bad actors became. There is still no substitute for good intelligent operating as an example of this we offer as proof, awarding to Mickey, W8YIN of "Worked Countries" certificate number 36. All of 118 countries were worked with less than watts in the antenna. By, W2ATJ has wor over 100 with low power, but most of were on fifteen meters where the going i little easier.

"Worked 100 Countries Two-Way SSB
(In the order of award)

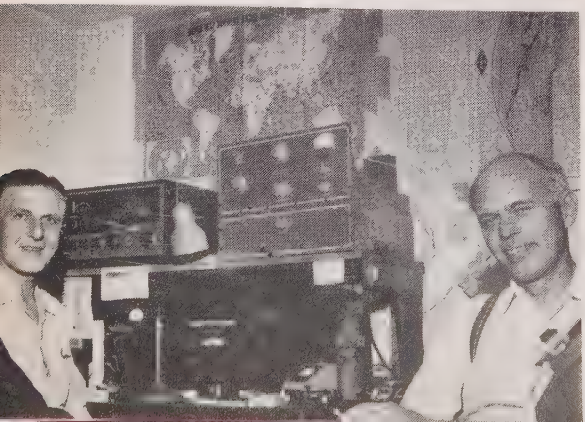
W6UOU
W2JXH
F7AF
K6GMA
W3SW
W4IYC
TI2HP
W8QNF
W6ITH
VE3MR
W8GCN
W8EAP
W8YBZ
W0QVZ
W0FUH
W8PQQ
ZL3PJ
K2MGE
W2OQO
W2VZV
W6IAL
K2JFV
W1ADM
TI2RC
W2CFT
K0ABH
ZL3IA
W6BAF
W2TP
W6RKP
PY2JU
W6UPP
W6PXH
W0CVU
W4INL
W8YIN

Several very excellently operated stati have been active from remote parts of world during November. We especially com ment Flavio operator of PY0NA on Trinid Island, who made thousands of contacts w his fine operating. He has now closed do but we will long remember him. Another operator is Soe-ya of XZ2SY in Rango Burma. In spite of the huge pileups, he giving a new country to hundreds of SSB s tions despite his low power. W0FUH was first contact. Soe-ya is not a Dxpedition a hopes to be on regularly. See Don Chess DX Bulletin for times and frequencies.

Another Columbian station came on twe SSB this month, namely Victor, HK3RR a your Editor was happy to be his first conta Vic promises to QSL all QSOs.

One of the earliest stations on SSB outs of the USA, is closing down and will le Tangier without a side-bander. CN2DD, D originally CT1DD, will leave shortly

[*Continued on page 99*]



Munich with Ron, G6LX—Hugh, DL4WX—Al, W2CFT.

ONTEST CALENDAR

Frank Anzalone, W1WY
Sherwood Road, Stamford, Conn.

January	9-11	DARC WAEDC CW
January	17-18	RSGB BERU CW
February	6- 8	ARRL DX Phone
February	20-22	ARRL DX CW
March	6- 8	ARRL DX Phone
March	14-15	QCWA QSO Party
March	20-22	ARRL DX CW

DARC WAEDC

e 4th annual WAE contest sponsored by DARC is limited to CW only this year. e object of the contest is for non-European tions to work as many stations on the Euro- in continent as possible.

The WAE country list will be used as a de for non-European stations. Use all bands, thru 28 *mc*. One point per QSO, two points 3.5 *mc*. Multiplier is determined by the nber of European countries worked on each id. Final score is the QSO points, plus the C points, multiplied by the sum of the intry points on all bands. Awards will be de for all band operation.

strongly recommend that the rules in last nth's calendar be closely studied.

Mail your log not later than March 15th to: RC DX Bureau, Fuchsienweg 51, Berlin- low, Germany.

RSGB BERU

he annual British Empire party is just that, tly for country members of the Crown. vill do you no good to call 'em if you do have a British prefix. So consider yourself WL for this week-end. Some of the BERU s are real touchy so don't get on their ck list."

ARRL DX

his is the 23rd year ARRL has sponsored one, so everybody should be well informed. the USA against the world. See QST for letails.

QCWA

he Quarter Century Wireless Association a QSO party last year and it proved so popular that it was decided to have another one this year. Details will be in next month's Calendar.

Claimed Scores For Phone Contest

Multi-operator

K2GL — 777,000
W6AM — 65,000

Single Operator—All Band

CO2BL	529,000	IT1CDS	106,000
9K2AZ	406,000	VE7ZM	84,162
KA2BE	249,000	KX6CM	69,000
DL4YE	243,000	XZ2SY	32,000
VE3AIU	167,000		

Single Operator—Single Band

CN8JX	149,000	28 mc	F7ER	37,000	21 mc
5A3TO	79,000	28 mc	KL7BHE	28,000	21 mc
LU9FAY	55,000	28 mc	HS1C	4,000	14 mc
W8UPN	45,000	21 mc			

Contest Results

PACC

Top man for the Netherlands in last year's PACC contest was PA0LOU with 137,228 points on CW. Winner on Phone was PA0VB with 4,805 points. Leaders in their respective countries were as follows:

CW	
Europe	
CT1AH	270
DM2ABL	5,125
EA5BD	945
F3ZU	2,304
G3IQE	5,544
GW8WJ	270
HA8CZ	1,680
HB9TT	2,622
I1ZCN	1,122
LA1K	1,911
OE1LM	1,120
OH2YV	8,526
OK1KMM	2,520
ON4GL	369
OZ2NU	408
SM5AHJ	4,950
SP9EU	5,025
UB5CI	729
UC2AR	1,944
YU3YW	1,710
Africa	
FA9VN	5,023
No. America	
W1JYH	1,584
W2CGJ	957
W3DBE	660
W5LGG	630
W6TMX	630
W8JIN	2,250
W9KXK	264
K0DQI	96
VE1EK	603
VE2IL	210
VE3XK	924
VO2NA	198
KL7CDF	63
KP4CC	846
XE1JP	24
So. America	
CE3AG	858
HK1FF	108
PY1ANR	504
Oceana	
ZL3OB	27
Phone	
Europe	
DJ1GJ	783
EA3LA	810
F9EQ	315
HA5DG	486
OH2KO	864
OK3KFY	273
SP9DT	396

Ed. Note

How about those contest logs for the CW section? There's a January 15th deadline, you know. And Club secretaries, don't forget to send in a list of participating members and their scores. It's necessary to do this in order to get club credit.

73, Frank, W1WY

Buzz Reeves, K2GL hits the jack pot in last year's contest. W1WY presenting him with two certificates and the K2AAA Trophy for being world high in the multi-operator Phone group.

by CHARLES J. SCHAUERS, W6QLV
CQ Magazine, 300 West 43rd St., New York 36, N. Y.

ham clinic

Ham Clinic has now been in existence one year. During this time, thousands of letters and cards have been received from hams all over the world. At times we found the going rather "rough," but as far as we can ascertain, everyone has received a reply; except those like Mike Terry who forgot to include their address, and for whom we hold mail.

Many letters have been received thanking us for the help extended. However, we did not nor can we *always* come up with *all* the answers. Although we did try to give complete satisfaction in every case, there was certain information we could not obtain.

Within the limits of the time available to us we shall continue to try to help you with your amateur radio technical problems. All you need do is to write HAM CLINIC, state your problem and be sure to include a self-addressed stamped airmail envelope. We cannot furnish diagrams of commercial equipment but we can tell you where and how to obtain them.

If you have read all of our columns you will see that we are impartial and "call the shots" as we see them. Opinions and statements in this column are always the writer's and do not carry the indorsement of any agency or group, governmental or civilian, unless so noted.

Transmitter Design

Among the many communications received are those written by the hams who build most of their own transmitting equipment. These we like to receive! Because the guy who "thinks" design is usually the one who sooner or later comes up with the novel circuits often adopted by the ham fraternity at large and sometimes by commercial manufacturers.

Requests have been received for transmitter *design* based on tubes which a ham has on hand. Some of these tubes are either obsolete, hard to obtain or now have more efficient and less expensive counterparts. We hate like the "dickens" to turn anyone down flat or suggest tube substitution, but this is what we must do in most cases of this sort. It is not possible for us to design, build and test *every* circuit requested. We can only suggest what can be tried with some degree of success.

Some of you wanted to know how we go about designing a small low-power transmitter, for example. Well, this is the way we do it: first, we decide whether we desire crystal or VFO control. Then we consider the bands to be covered; whether the rig will be mobile or fixed; CW or phone; and then the final *rf* stage. With these things in mind, we work from oscillator design through buffer amplifier (s)—depending on band coverage, to the final. Earlier stages are picked so that sufficient final excitation is available. The type of modulator and power supply (along with control circuits) are considered last.

Other designers approach the task differently, but regardless of how it is done, there are hundreds of little facets which must be thought of in the design process.

Designing a transmitter for one band only (unless it is to work in the UHF or SHF regions) is seldom done now. Nearly any amateur transmitter can be made to work well with little effort on two adjacent bands, i.e., 40 and 80 meters.

Many amateurs think that it is relatively easy to "rob" circuits from a number of different transmitters and come up with the "ultimate." This has been and is being done by those who have had a great deal of experience. But sometimes the reasoning behind this method is not exactly correct. "Circuit meshing" (as I call it) takes intimate know-how of each stage and its operational parameters as they affect *succeeding* as well as *preceding* stages. You can't drive a 304TL in grounded grid efficiently with a 6L6 no matter how hard you try.

Diagrams of "transmitters" have been received which indicate that the "designer" did not know how to interpret tube characteristic charts or had none. For example, one diagram received had an 807 in it with 2000 volts on the plate! With that much juice on it, that little 'ole tube would no doubt resemble the sun at high noon!

To become proficient in transmitter design takes time and study. Those today who are capable of designing multi-band transmitters are those of yesteryear who began by building a one tube 6L6 crystal oscillator and progressing from there.

Of the many transmitters I have designed and constructed, only one required less than three major changes; the others all required up to a dozen! The slide-rule, tube charts, inductance and capacity charts and so on, are essential tools of the transmitter designer; but take it from me, so are the vacuum tube voltmeter, grid dip meter, oscilloscope, impedance bridge and other test equipment.

## Observation

Many manufacturers include with the radio parts they sell, tested circuit diagrams incorporating these parts. Unless the ham is actually working from a construction article calling for hese particular components (which he buys), e never knows of the existence of these diagrams.

Recommendation: that parts manufacturers n their advertising include information relaive to the availability of tested circuit diarams using their parts.

Questions

onization

"What causes ionization of the atmosphere hich in turn affects radio propagation?"

Current theory: meteors, particle radiation, osmic rays and ultra-violet rays.

C-183

"I have a *National* NC-183 which has served nd is serving me well, but lately it seems to ump frequency.' Any cure?"

Yes. According to Service Bulletin No. 1 of e *National Co.*, this condition has been aced to faulty oscillator trimmers (aging of tor connection). Some have shifted in shipent and the trouble usually shows up only the higher frequency bands. Many times, is condition may be cured by removing the ndenser strip, applying heat to the bracket us melting solder) and adding slight pressure the rotor contacts by pulling the tab while e solder is liquid. Sometimes the condenser ust be replaced.

RO-60

"What can I do to prevent radiation of haronics of the *if* frequency in my HRO-60?"

Remove resistor R-68 (see diagram) from wer supply and add it to the *rf* unit between ns 4 and 2 of tube V-9. No change on ematic — mechanical change only. (Many nks for this and other service information on *National* receivers to be published from time to time, to R. J. Murray (W1FSN) Service Manager of *National.*)

Rhombic Antenna Coupler

"I understand that there is a commercially made rhombic antenna coupler on the market. Who makes it?"

Write *Technical Materiel Corp.*, 700 Fenimore Rd., Mamaroneck, N. Y. Ask for information on their Models RAC.

VHF Rhombic

"Do you happen to have some info sheets on a rhombic antenna for the 2 meter band?"

No, but if you will write to *Illumitronic Engineering*, Sunnyvale, Calif., and ask for their "rhombic design sheet #1" they will send you one. These are the people who make *Air-Dux* coils. The information you receive from them can be *adapted* to your requirements.

EICO

"How come," writes Gene Van Sickle of *Van Sickle Radio Supply Co.*, Indianapolis, "you didn't mention EICO as a maker of fine do-it-yourself electronic kits along with others in one of your recent columns?"

I'll take the blame on this one—an oversight. Although I have never built any EICO ham or test equipment, I have built one of EICO's hi-fi amplifiers which turned out to be TOPS! The new 90 watt #720 transmitter looks good as well as the #710 grid dip meter. When more user information is available on these items they no doubt will make our full recommendation list.

Screen Modulation Tests

"How is an oscilloscope usually connected to a transmitter for screen modulation percentage tests (trapezoidal pattern)?"

A parallel tuned circuit (resonant to the transmitter frequency) is connected across the vertical plates of the oscilloscope. This circuit is in turn inductively coupled (via a 2 or 3 turn link) to the transmitter final. A 1 megohm pot (one side grounded) is coupled to the *top* of the modulation (*af*) transformer through a .02 mfd condenser that has a voltage rating twice the operating voltage. The center arm of the pot is connected to one horizontal plate of the oscilloscope; the other horizontal plate being grounded.

SX-71

"I have a *Hallicrafters* SX-71 receiver which has worked fine until about two weeks ago when I went SSB. Stations I receive just do not seem to 'want' to stay tuned in. How about some help?"

We do not have service sheets on this particular model receiver. However, friends of ours have modified theirs by adding better voltage regulation to the BFO. They have also re-mounted the *hf* oscillator with a "floating"

[*Continued on page 99*]

by **DONALD L. STONER, W6TN**
P.O. Box 137, Ontario, Cal

Novice

I had a very pleasant contact the other day with K4RID and K5LZO, on the 15 meter band. Both Bill and Chuck are ex-Novices who have graduated to the single-sideband ranks. K4RID confirmed the fact that he had made the coveted DXCC as a Novice, with 103 countries confirmed. I hasten to add that Chuck also racked up an impressive total, something like 87 confirmed. Now the boys are working on the CQ Award, DXCC Two-Way SSB.

Theory

If you have ever tried to trace out the current paths in a Novice transmitter, or other electronic equipment, you may have wound up slightly befuddled. The power supply delivers potential energy (voltage) to the various circuits in the transmitter. One usually winds up asking "Which way do electrons flow, positive to negative, or the other way around"? Some text books say positive to negative, while others say negative to positive. Here's the way I look at it. In a vacuum tube circuit (an oscillator, as an example), the plate eventually winds up being connected to the positive voltage source in the power supply. The cathode is usually grounded after going through various components (*rf* choke, key, jack, etc.). The negative terminal of the power supply is grounded to the chassis also.

When the filament in our oscillator tube is energized, it heats the cathode to a very high temperature. Electrons in the oxide coating on the cathode bubble and froth like a pot of boiling water. If the plate is positive (with respect to the cathode), these electrons will be attracted to the plate, and the tube functions normally. If the supply is reversed (so that the plate is negative with respect to the cathode), the electrons will not be attracted to the plate, and in fact will be repelled. The electrons cannot be sent from the plate to the cathodes for two reasons. First, the plate does not get hot enough to emit sufficient electrons, and second, if the power supply is correctly connected the plate can only attract electrons.

Thus it should be obvious. Electrons flow from the cathode to the plate, the cathode is negative and the plate is positive. Therefor as I see it, electrons flow from negative positive in the circuit that is connected to th power supply.

Other than the above explanation, I kno of no way to prove which way they flow. Th is because all measurements would be base on supposition. When electricity was first di covered, measurements were made to dete mine the direction of electron flow. It no appears that the early conclusions were wron The great majority of text books support th above statement (about the direction of ele tron flow), but many others have never bee changed to correct the error. And as a resul confusion exists.

In early experiments pertaining to electricit a compass was used to indicate the presenc of magnetic lines of force. But here agai another assumption rears its ugly head. It wa believed that magnetic lines of force emana from the north pole, and enter the south po of a magnetic body (such as a compass needl or even the earth). The original conclusion were based on this assumption, and wou now appear to be incorrect.

One more point in this connection shoul be mentioned. Let's connect a battery to ou tube, with the positive terminal on the pla and the negative terminal on the cathode. A suming the cathode is emitting electrons, the will flow from the cathode to the plate (neg tive to positive). But what happens when Jo Electron flows through the battery? What d rection do electrons flow inside the battery By golly, inside the battery (or source c power) they flow from positive to negativ Maybe the old geezers were right after al While you are mulling over this last paragrap let's progress to the next order of business.

DX News

How's this for a hot tip? Bill Channey K6KKV, 5008 Cahuenga, North Hollywoo California writes: I will be going to Korea of 14 January 1959 and would like to try fo WAS-Novice. I would like skeds from Novice

as many states as possible. I am taking a
ollins KWM-1, and a vertical ground plane
r 15 meters, and 1,000 QSL's. All skeds can
arranged thru K6UJW. Thanks for the info,
ll, I hope you know what you are letting
ourself in for—hi. Korea peaks up in the
ates between 1400 and 1600 GMT (0600-
00 PST) fellows.

From Harold T. Cogburn, HM1, SVØWAE,
SCGC Courier (WAGR-410), APO 223,
ew York, N. Y. comes the following good
ws. Hal is on the Isle of Rhodes, and has
st received his Novice ticket (KN4ASR) and
reek Ticket (SVØWAE) and is working 15
eters 5 days a week, between 1900 and 2100
MT. He uses a DX-100B, NC-173, and a
½ wave length long wire, and will QSL 100%.
al says "The boys will have to hold their
eed down to 5 wpm for this frustrated
ovice."

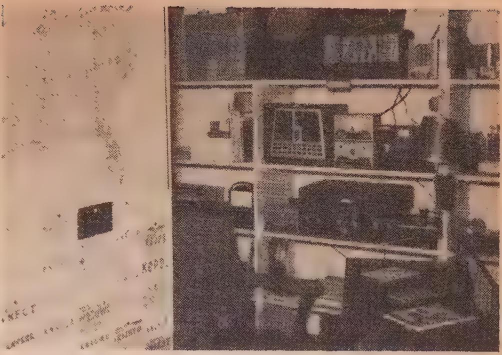
George Mertze, CO2US, P. O. Box 63,
arianao, Cuba, is active on the 7 and 21 mc.
ovice bands with a Viking Valiant. He, and
nny, CO2QH, will be glad to sked Novices
siring a contact with Cuba.

October 2, at 1945, PY7AFK called CQ
N/KN. Right after he signed, a WV6 came
calling CQ-DX. Moral—listen carefully!
e call you hear may be your own!

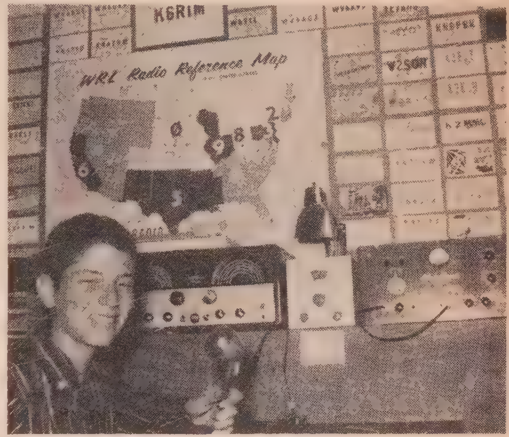
The following stations were heard in Yugos-
ia by our friend Tima Popovic, YU1-RS-
7 (YU1FR), Banat Novo Sello. They are
mc signals and all times are GMT. Aug. 27,
50-1920: KN2SMK, WP4ANH, KN4RVU,
L, UTF, YEA, YHM, YIG, YMU, YNO,
D, ZRU, ZUH, ZVC, KNØQDJ. Aug. 28,
40- 1750: KN2HQQ, OGN, KN4SLE, SWO.
g. 30, 1800-2115: KN1EDW, GBK, GRU,
D, HVU, HZQ, KN2JXF, JZM, KQM,
Q/3, KYH, OQY, OWU, REE SBZ, TER,
3CXC, DDK, DZN, EDX, EFT, EPN,
M, KN4TPD, UGT, VNH, VUU, YEP,
M, YXK, ZYS, KN5POD, PYH, QYY,
N, KN8HZK, ILU, IOT, IPQ, LKC, LUS,
C, KN9MRM, KNØLOK, PDP, PWY.
t. 9,1844-2030: KN1GWG, INW, KN2-
Q, QHR, TQJ, KN4UOD, YNX, KN5QQB,
6ARX. October 2, 1815-2140: KN1DSS,
Y, EKW, GCD, GDX, GMI, GRJ, HIS,
N, HKC, IAQ, IEM, IKN, INX, IRG,
2AAC, AXQ, KN2BBH, WV2BDW, KN2-
L, JLZ, JOK, MPU, OWT, PMY, REI,
E, TZG, UVU, KN3CUO, DSM, EDP,
, ETU, RHC, K[illegible]CMK, TIA, TJK,
M, UUH, VGD, YMU, YXC, ZMU, ZYM,
/4, ZYU, WP4KDE, KN5GPC, OPC,
7BXB, KN8JVJ, KFC, KTZ, LDC, LDF,
), KN9KTF, LVD, MMK, OGG, KNØ-
J, OHD. Many thanks for the fine business
rt Tima, see you next month.

/Sgt. Bud W. Lafferty, 1983rd AACS Sq.,
253, APO 23, New York, N. Y. is still
to get on 15 meters occasionally with a
owed rig. Novice QSL's may be sent to

[*Continued on page 107*]



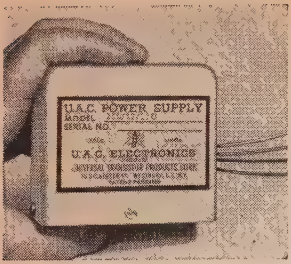
A very neat layout will be found in the shack of Everett Hawlye, KN8JTT, 790 S. Oxford Rd., Grosse Pointe 36, Mich. Everett works the 40 meter Novice band exclusively and has a WAS of 39 since April. Skeds from the Rocky Mountain States are welcome, plus Ore. and Vt.



From that smile, you'd think that Al Birnham, K6RIM, had just worked JT1AA! Al has "graduated" to 10 meter phone from the Novice band and will be glad to help any prospective Novices with their ticket or General Class license.

Dig that crazy wall paper in the shack of Carl Wells, KN6GUI, 2916 Heather Avenue, Redding, California! Carl is trying to work VK2 and would also like to sked Maine, Conn., Wis., W. Va., R. I., and Wyo.

New Amateur Equipment

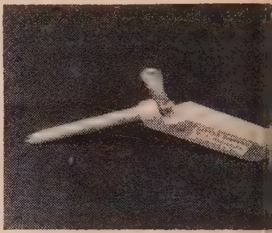


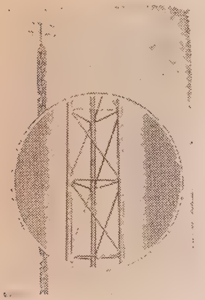
Mobile Power Unit

Universal Transistor Products Corp. has a cute little transistor power- out which conjures 12 volts into 250 volts @ 130 ma., all rectified and filte This little job will get you away from vibrator hash and ripple miseries well as give you up to 95% efficiency. Remarkable. Crunch A on page 126 Universal will get you all the info plus dope on some transceiver supplies make.

Little Snipper

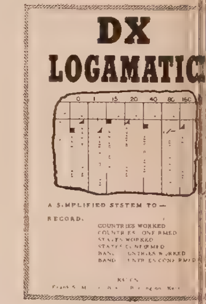
Ever want to cut a wire tucked way up in a corner somewhere? This can be a frustrating experience. E. V. Nielsen, Inc., has an out for you in their Little Snipper which grabs ahold of the wire at the end of a rod (comes in 2", 4" and 6" lengths) and, with the twist of the lever, snips it off. The lever operates an aircraft steel blade at the end of the rod which will slice through copper wire up to #8 and stainless stell up to #20. Prices? They didn't say, but you'll find out if you perforate B on page 126.





Tower

Rohn Manufacturing Co. has just come out with a new tower that looks ideal for ham use. It can be used self-supporting up to 50 feet and guyed up to 150 feet. The side rails are made out of extra heavy duty 1¼" tubing and the zig-zag cross bracing is solid steel. Listed as their #25 tower, it is 12½" on a side and is designed to handle big TV arrays and ham beam pileups. Check C on page 126 for data and prices.



DX Logamatic

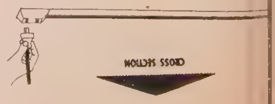
K4OCN has whomped up a little booklet for you to keep track of states and countries worked and confirmed on all the different bands. This 16 pager sells for $1. Write K4OCN, Box 7, Burlington, Kentucky. He has vertical columns for 10-11-15-20-40-80-160 meters, with separate places for cw-am-ssb contacts. Horizontally at the countries and states so that you make a mark in the square provided when you work that country or state and fill it in when you confirm it.

Auto Gutter Clamp Antenna

The Antenna Specialists Company has a gadget that clamps onto the gutter of your car so you can hook up a mobile antenna in half a mo' and unhook it in a like time. Comes with 12' of RG-58/U, a PL-259 adapter, and the whip cut to any desired length for any frequency between 108-174 mc and 450-470 mc. Costs $11.50 retail. Wanna know more? Circle D on page 126.

Electriduct

Need to run a wire across the bare floor? This stuff will do it and keep people from stumbling over it. It is a wire which hugs the floor tightly and has nothing for anyone to catch their feet on . . . see cross-section in cut. Designed for 15 amperes. Catalog sheet if you circle E on page 126.



OVERSEAS ECHOES

Thomas K. Aalund, K2VBI
Box 13
Roslyn, L. I., N. Y.

Revista de la Radio de la Union de Radioa-
onados Espanola, in the August/September
e, carries an article by Anthony M. Bille,
LZL, of the M.I.T. It covers a crystal con-
led converter for the 6, 10 and 15 meter
ds that requires only two crystals. Advan-
is taken of the fact which might be very
ul in the design of other and similar equip-
t. A nominal *if* frequency of 7 *mc* is used
the circuit functions as follows: The third
nonic of the oscillator crystal (7 *mc*) is
nc. On the 10 meter band band the signal
uency of 28 *mc* will result in an *if* of 7 *mc*.
the 15 meter band the second harmonic is
nc and the difference between this and the
ming signal frequency of 21 *mc* is again
c, our *if* frequency. For the 6 meter band
6 *mc* crystal is used, and the fifth harmonic
, at 43 *mc*, combines with our signal fre-
cy of 50 *mc* to give us the same *if* as above,
being the bottom end of the band on the
on receiver. Coil data as well as lay-out
estions are given. The tubes used are 6CB6
5U8.

ur congratulations go to **Amateur Radio,**
whose October issue is their 25th anniver-
issue. It contains several nice items such
six tube transceiver for the 5 meter band,
American tubes. The transmitter section
ystal controlled. W7TNA describes a
mitter combining features of dsb sup-
ed carrier and dsb reduced carrier. The
ed carrier "fools" the S meter of the re-
as well as the *avc* circuit, as *avc* action
ntrolled by carrier level. The low-level
r of the signal causes the receiver to run
higher than normal gain. The same issue
describes the set-up at VK2WI, which is
Q station of the VK2 division. A five-
article by W2PAU and W2AEF carries
tle "Applications of the Grid Dip Oscil-
"

the October issue of **The Short Wave**
zine, G. DL4SV/W9NTV, who is their
ssb editor, describes several electronic transmit-receive switch designs. Some are outstanding because of their simplicity and should do a lot to increase the popularity of this item.

As we previously mentioned, we are maintaining a file of the latest QTH listings as they become available and we now have the latest listings for all F2 stations. We also received a copy of the **Hong Kong Amateur Radio Transmitting Society** bulletin, which contains a complete membership directory giving the QTH of all VS6 stations, of which there are 36. Most commonly used bands and modes of transmission are also listed, as well as three CR9 stations. The above information is accurate as of September 1958.

A very interesting mobile rig is described in the August/September issue of **Radio REF,** F. Admittedly the operating frequency is not in any of the amateur bands, but this does not distract from the interest value of the rig. Brace yourself—it is a mobile rig dating back to 1908. The photos show two transmitting stations installed in horsedrawn vehicles as they were used by the French army of that day. We have come a long way since that time but articles of that kind always remind us that a lot was done even in those early days. The same issue also continues a series of articles for the new amateur. In past articles, the first of which appeared in the November 1957 issue, elementary principles were covered as well as some construction notes given. The present article covers the operating principles of trf receivers as well as the design of such units. It is not too long ago when this writer, back in Europe, also used such a receiver, known as an 0-1-0.

The October issue of the above magazine describes an entirely different kind of mobile rig. F3WE has built himself a unit which in one enclosure provides for the following: receiving and transmitting facilities on the 80, 40, 20, and 2 meters as well as 435 mcs! In addition to all this there is provision for direc-

[*Continued on page 124*]

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Advertising Manager, CQ
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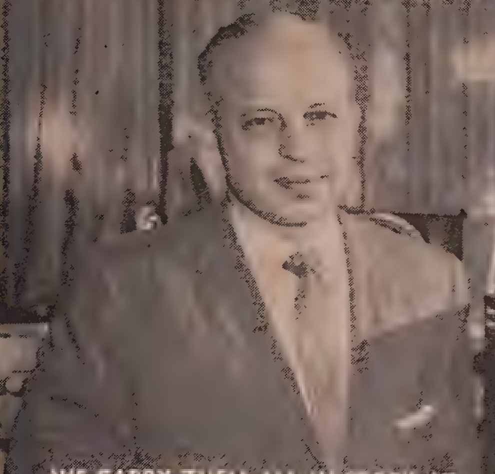
AYS LEO I. MEYERSON, WØGFQ,
WORLD RADIO PRESIDENT



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Easy Assembly • Easy Operation

6 METERS

6M, 5E
9 db Forward Gain
Net wt. 9 lbs.
Boom length: 9 ft.

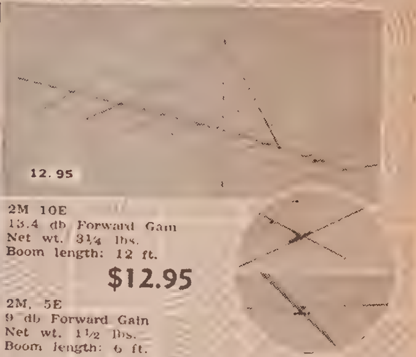
$15.95

6M, 8E
12 db Forward Gain
Net wt. 18 lbs.
Boom length: 18 ft.

$26.95

New pre-calibrated (Gammaxial) Gamma Match assembly with coaxially formed reactance cancelling capacitor built in, makes possible for the first time a perfect 1:1 SWR. Coax connector for 52 ohm feed included.

2 METERS



2M 10E
13.4 db Forward Gain
Net wt. 3¼ lbs.
Boom length: 12 ft.

$12.95

2M, 5E
9 db Forward Gain
Net wt. 1½ lbs.
Boom length: 6 ft.

$6.95

1¼ M

1¼M, 11E
14.2 db Forward Gain
Net wt. 3 lbs.
Boom length: 12 ft.

$10.95

¾ M

¾M, 13E
16.1 db Forward Gain
Net wt. 1¼ lbs.
Boom length: 8 ft.

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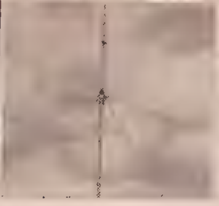
All hy-gain 2M beams incorporate the hairpin dipole matching system. Perfect 200 ohm match for K 200 low-loss parallel line or 52 ohm coax thru a half-wave balun. Instructions included for matching 72 ohm coax, 300 & 450 ohm balanced lines. ¾ and 1¼M beams use ratio dipole adjusted for perfect match to 450 ohm low-loss open wire lines.

2 & 6 M's



VHF VERTICAL

A new decoupling sleeve principal makes possible low SWR ¼ wave resonance maintaining efficient operation for the 2 and 6 meter bands. Overall height 5'. 52 ohm coax feed. Net weight: 24 oz. Complete with 2 band tubing ground plane and nylon base insulator assembly.

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C-1

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For further information, check number 23 on page 126.

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VESTO'S
Hurricane-Proof* Self-Supporting
TOWER

"Mage" Magers
WØOJI, President
A Ham Since 1910

A Galvanized Tower that will last a lifetime. Ten sizes to choose from! 22 ft. to 100 ft. Easy Terms Available.

VESTO TOWERS OFFER YOU:

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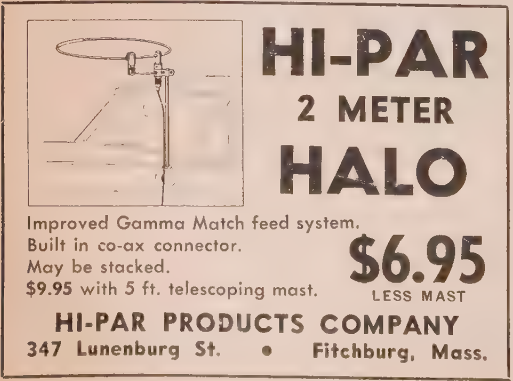
For further information, check number 26 on page 126.

RM52 REMOTE CONTROL UNIT. For conversion to Macy's Special Patch. See October 1958 CQ Mag. $1.95
RM53 CONTROL UNIT used with RM52 as Intercom Set $1.95
Pair w/carrying case & manual. NEW $3.90
BC653A TRANSMITTER 2-4.5 mcs. 100 W. output.
PUSH-PULL 814's in final control grid mod. Brand New. Less Dynamotor $39.95
FULL WAVE BRIDGE RECT. (SEL.) 18V. in 12 out 1 Amp 49¢
DIHEPTAL SOCKETS for scope tubes 49¢
2" SQUARE METERS 0-20V. DC $1.75
2" SQUARE METERS 0-40V. DC. $1.75
BLEEDER RESISTORS 50,000 ohm 100 W. 49¢
FILTER CHOKES 10 HYS. 420 ma. $5.45
FILTER CHOKES 10 HYS. 310 ma. $4.75
PLATE TRANSFORMER 1080 V. Ct. 420 ma. $4.75
TUBE SPECIALS: 1630—49¢; 1613—$1.25; 807—97¢; 814—$1.45; 843—19¢; 12HP7—$10.95

MAY ELECTRONICS CORP., ROOM 600
300 West 43rd Street, New York 36, N. Y.



HI-PAR
2 METER
HALO
Improved Gamma Match feed system.
Built in co-ax connector.
May be stacked.
$9.95 with 5 ft. telescoping mast.
$6.95
LESS MAST
HI-PAR PRODUCTS COMPANY
347 Lunenburg St. • Fitchburg, Mass.

CLUB BULLETINS [*from page 14*]

extended to them in April 1959. THE LOG, Flint Hills, A.R.C., just entered its 5th year of successful publishing, while YARC-MITTER, Yonkers A.R.C., and NORTHWEST HAM NEWS, Arrowhead R.A., became one year old.

CQ NEWS went to these new members for the first time in the last month: CQ CHESTER COUNTY, Chester County E.C.N., U. of ARKANSAS A.R.C. NEWS, U. of Ark. A.R.C., QSO, Channel A.A.R.C., SRA BULLETIN, Spokane R.A. Soc., BANDSPREAD, Wabash Valley A.R.A., THE BUGLE, Confederate Signal Corps. Inc., and SKYWAVE, South Shore A.R.C. Inc.

Finally, if you read this column regularly, don't forget to mark the survey card at the back of the magazine. We are depending on all our readers; all 5 of them.

73, Marv, VE3DQX

SCRATCHI [*from page 12*]

So, sending Old Tryed and Trew way to cutting qso short: XYL CALLING ME TO CHOW CUL and sineing. No luck. He coming back like he not heering. So, next time, trying out OLD T & T number 2: SRY OM MUST QRT OFF TO WORK and sineing. No luck again. Amchoor acting like he getting ten bux for every minute he being on air.

Next time back getting little desprit. Trying O T & T number 3: QRT OM BIG QRM NO COPY U and sineing. He coming back saying some qrm on me but not worrying he copying solid. This time when going back are seerching for his week spot, so trying O T & T number 17: MUST QRT AM IN CONTEST and sineing. Evidently he not contest man on acct. this not slowing him down one little bit.

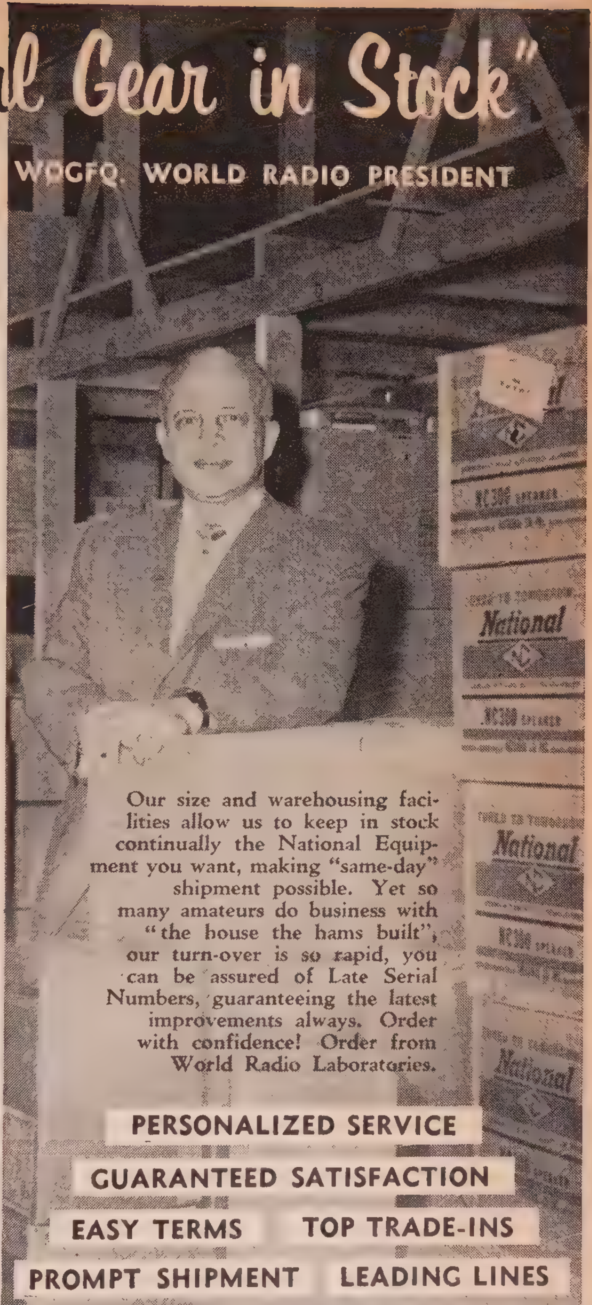
Before going back this time desiding I needing to use a reel good O T & T. Thinking over number 33: MUST QRT HOUSE ON FIRE but desiding not beleevable. Or number 37: MUST QRT OM AC PWR LINES DED but desiding that not beleevable ether.

Finely desided to using Old T & T number 13, so sending: TNX QSO OM MUST QRT SKED COMING UP and sineing. He coming back as follows:

R R R WL OM GESS SA 73 AND QRT FOR CHOW SURE NICE QSO TNX FER CHECK ON MY FREQ DRIFT BUT GLD TO KNOW NOT BAD IF I STILL IN BAND HI HI THOT MAYBE I HAVE TO BUY NEW XTAL SO 73 AND CUL UR LITTLE RIG SURE FB SIGS HR HI HI JUST WAIT TILL YOU PUT ANT. ON IT HI HI WL OM GESS SA 73 BUT SA ABT QSL WL MY QTH IN BK NOT CORRECT AND ANY-

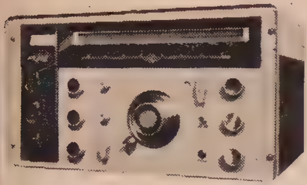
"Late National Gear in Stock"

SAYS LEO I. MEYERSON, W0GFQ, WORLD RADIO PRESIDENT



THE GREAT NEW

National NC-303



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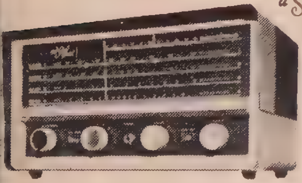
$25.50
per mo.
or $449
Amateur Net

Here's the time proven features of the fine NC-300 plus the following features. Front panel selector provides instant sideband choice. Retuning or detuning eliminated. "Q" Multiplier. 5-position IF selector (.5kc, SSB-1, SSB-2, 4kc, 8kc). Separate ANL for AM. Separate manually adjusted limiter for CW, DSB and SSB. WWV converter position. Hi-speed 40-1 ratio tuning dial. Fine tuning vernier dial on CW, SSB and DSB. Antenna trimmer. 15 tubes. Sensitivity: 1.5mv. Image rejection 50-80db. Black & grey enamel finish. Shp. wt.: 64 lbs.

and the first, all new, low-priced shortwave receiver

National NC-60
"Special"



$6.00 down
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The NC-60 Special Receiver offers continuous coverage of AM broadcast, Amateur and world-wide shortwave bands. Full electrical bandspread. General coverage 540kc to 3mc in 4 bands. Bandspread knob can be used as vernier on all frequencies. 5 tubes. Built-in speaker. Two-tone grey and black enamel. Shp. wt.: 15 lbs.

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Our size and warehousing facilities allow us to keep in stock continually the National Equipment you want, making "same-day" shipment possible. Yet so many amateurs do business with "the house the hams built", our turn-over is so rapid, you can be assured of Late Serial Numbers, guaranteeing the latest improvements always. Order with confidence! Order from World Radio Laboratories.

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Dear Leo: Please send your free 1959 Catalog, information on the National line, and quote your best trade offer on my present

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For further information, check number 24 on page 126.

Write us... get Henry's trade-in offer first... and save money!

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Single Sideband at Its Very Best!

Triple conversion **HQ-170** • 20 monthly payment $17.77. $35.90 down. CASH PRICE $359.00. Radio amateur's ideal for modern SSB reception in performance, tuning techniques, dependability. Clock timer $10 extra.

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HQ-110 RECEIVER	$249.00
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Complete stock of all transmitters, receivers, antennas, rotators, towers, parts, accessories, equipment. Henry has ALL the new equipment first.

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For further information, check number 27 on page 126.

HOW NOW WRKING PORTABLE SO WAIT TILL U GET MY QSL THEN U SENDING TO QTH SHOWING ON QSL BE SURE GIVING ME UR QTH SO CAN SENDING QSL TO U AND TNX FOR CHECK ON MY FREQ DRIFT AND UR RIG DOING FB HR NOT KIDDING OHOH ALREDY SAING THAT HI HI SO GESS SA 73 LET ME HAVE UR QTH DO U COPY TT OK LET ME CHECK UR FREQ QRX . . . OHOH BIG QRM BEST QRX MINUTE WL OM GESS SA 73 SURE FB QSO EVEN THO NOT BIG DX HI HI OH U ASKED ME ABT WX HR WL ABT THE SAME EXCEPT OL WINTER SETTING IN LAST NITE DROPPED TO 50 WL LET ME KNOW ABT QTH AND SA OM U HR ANY DX LATELY HI HI LET ME KNOW DX NIL HR AS RCVR RF SECTION BURNED OUT MONTH AGO HI HI WL OM SA 73 SWELL QSO SPITE OF QRM THINK MISSED UR HANDLE BUT LEMME KNOW HANDLE AND QTH AND HWS UR WX AND WAT DO YOU DO TO MAKE A BUCK HI HI . . . .

Hon. Ed., at this point are turning off reseever. If you wanting to knowing how it coming out suggest you tooning to low end forty meters on acct. he probably still on.

Respectively yours,
Hashafisti Scratchi

PROPAGATION [*from page 73*]

ably, with MUF's soaring well beyond *10-meters* to most areas of the world. On October 26th conditions were just about normal for most of the day. The last six hours of the Phone period were, however, somewhat marred by the beginning of another radio storm, with signals dropping in strength, and flutter fading observed on many paths.

All in all, however, conditions during most of the Phone period can be summarized as fairly good on *10, 15, and 20-meters*, and pretty poor on *40, 80, and 160-meters*. Except possibly for slightly overoptimistic *80-meter* predictions, the CQ Propagation Charts in the October column were quite reliable. The last minute forecast, sent out a week before the Contest period to over 100 readers of this column, was accurate for 8 out of the ten time periods covered.

Conditions during the 1958 Phone Contest period were somewhat below those of the record-breaking 1957 Contest, and the effects of this have already been noticed from the somewhat lower scores that have so far been reported to CQ.

We'll have a critique of the CW Contest period next month.

Review 1958, Outlook 1959

Next month this column will review the

Henry Guarantees You...

Bob Henry
WØARA
Butler, Mo.

Ted Henry
W6UOU
Los Angeles

WORLD'S *Best* TERMS *on the* NEW *Collins*

32S-1 TRANSMITTER!

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0 days open account or 10% lown, 20 months or more. We inance at a low 6%. Payment vithin 90 days cancels all interst. Compare terms and prove to ourself that you save money at Henry. Write today to start your 0-day open account.

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Ve want to trade and we trade ig. Truly liberal allowances on our old equipment. Tell us what ou want to trade. We also pay ish for used equipment.

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early all makes and models. Big vings! Ten day trial—90 day arranty. 90 day full trade back new apparatus. Write for lletin.

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32S-1 Transmitter—3.5-29.7 mc. 175 watt PEP input on SSB; 160 watt on CW. Incorporates time-proved features of KWS-1, KWM-1 including Mechanical Filter-type sideband generation; stable, permeability-tuned VFO; crystal-controlled high frequency oscillator; RF inverse feedback for better linearity, and automatic load control for higher average talk power. 6⅞" H, 14½" W, 11⅝" D.

32S-1 Transmitter—Net Price	$ 590.00
516F-2 AC Power Supply	105.00
516E-1 12V DC Power Supply	262.00
75S-1 Receiver	495.00
312B-3 Speaker	27.50
312B-4 Speaker Console	185.00
75A-4 Receiver	695.00
KWM-1 Transceiver	820.00
KWS-1 Transmitter	2,095.00

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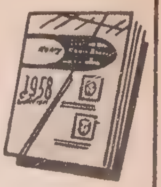

World's Largest Distributors of Short Wave Receivers

For further information, check number 28 on page 126.

YOUR mailing strip is IMPORTANT

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189 BCH 112TH ST
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This is a typical mailing strip

Whenever you write to CQ concerning your subscription, change of address, or renewal, cut your mailing strip from the wrapper of your latest copy and attach it to your letter.

This will help us to find your stencil in our files which is the first step in faster, more accurate service to our readers.

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CQ Magazine
300 West 43rd St., New York 36, N. Y.

history making propagation events of the pa year—some results of the IGY; the inten solar cycle peak; and some of the contributio made by earth satellites in our understandi of the ionosphere, and short wave radio prop gation. We'll also have a look at 1959—wi a long range propagation forecast, and a bri discussion of the International Radio Confe ence that will take place during the new yea

73, Geor

YL [*from page* 77]

YL Nets

Accurate information for a full listing of the YL ne is not available, but here are some of the new ones, a some that have changed time or frequency since t list appeared in this column a year ago.

Freq. (kc)	Day	Time (ST)	NCS	Name
3750 (cw)	Mon.	1300 C	W9MYC	LARK
3915	Thurs.	2000 P	K6HHD	3C's
7235	Mon.	0900 M	K5GYZ	Loaded Clothes Li
7250 (approx.)	Fri.	0930 P	Rotates	LA/YLRC Roundtabl
7280	Wed.	1400 C		ACARA Y
21,392	Wed.	1230 E	KZ5VR K5MMY-W4SGD Alt.	Cross Country
29,000	Fri.	2200 C	W9BCA	LARKNES
29,130	Tues.	1300 E	K6EXQ K9CQF Alt.	Hair Pin

Here and There

Congratulations to these YLs who have r cently earned WAZ. No. 8 among the YLs achieve this DX award is Blanche Edward W9QLH. K5ADQ, Nikki Boyd, also has WA confirmed. . . . Condolences to W4BWR, Rut president of the Floridora YLs, whose O passed away on Oct. 31.

The Texas YL Round-up Net held its 4 annual birthday party at Tyler, Tex. Nov. with 36 net members, 10 other YLs and sever OMs attending. Party chairman K5IMD, Bett was assisted by K5IHF, W5LGY, W5YA KN5RJJ. The YLs plan to hold their 19 party at Ft. Worth with WHO members hostesses. TYLRUN officers elected for 19 are: Pres., K5BWM, Johnnie; V.P., W5JC Bertha; S-T, K5PIO, Marge; P/C, W5DI Ann.

Officers for the Portland Roses for t '58-59 term include: Pres., W7RVM, Hele V.P., W7HPT, Beverly; Secy, W7QK Donna; P/C, K7ADI, Ruth.

"CQ YL"

What—you don't have your copy yet? Th one and only book devoted exclusively to t YLs in Ham radio. 18 chapters, 500 phot graphs. Autographed, postpaid, $3.50, eac Order "CQ YL" from your column edito W5RZJ, 212 Sombrio Dr., Santa Fe, N. Me

All the best for 1959! 33, *W5RZJ*

MAKE THIS A Single Side-Band Christmas

CONTACT
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HARVEY

All that's new . . . All of what you need . . .
Ready for delivery As soon as your order is received

JOHNSON VIKING "PACEMAKER"
An outstanding power bargain when used as a transmitter or exciter! 90 watts SSB P.E.P. and CW input . . . 35 watts AM. Complete coverage of bands without crystal switching or re-tuning. Instant bandswitching 80, 40, 20, 15 and 10 meters. **Cat. No. 240-301-2 . . . Wired Amateur Net $495.00**

VIKING "THUNDERBOLT" AMPLIFIER
Rated at 2000 watts P.E.P. input SSB; 1000 watts CW; 800 watts AM linear! Continuous coverage 3.5 to 30 mcs.—instant bandswitching. May be driven by the Viking "Ranger", "Pacemaker" or other unit of compatible output.

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240-353-1 . . .	Kit . . .	$524.50
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HALLICRAFTER HT-32 XMTR
Provides S.S.B. AM or CW output on 80, 40, 20, 15, 11-10 meters. Exclusive high frequency 5.0 mc quartz crystal filter cuts unwanted sideband 50 db. or more. Patented Bridged-Tee modulator; temperature stabilized and compensated. **$675.00**

HALLICRAFTER SX-101 RCVR
Complete coverage of 7 bands—160, 80, 40, 20, 15, 11-10 meters. Special 10 mc. pos. for WWV, plus coverage of major MARS frequencies. Exclusive crystal controlled upper/lower side band selection. **$395.00**

HAMMARLUND HQ-170
For the amateur who wants the very finest in SSB receivers. All the functions necessary for solid contact in today's bands. 17-Tube superheterodyne. 6, 10, 15, 20, 40, 80. **$359.00**

GLOBE SIDEBANDER DSB-100
Bandswitching 10-80M; 100W P.E.P. DSB Input, suppressed carrier; 40w AM Phone; 50w CW. This dandy, complete transmitter will give you the right start in amateur radio. Use it for 50w CW until you get your general license.
Kit: $119.95 Wired and Tested: $139.95

R. L. DRAKE SIDEBAND RECEIVER-1A
All the features that have made this tops for SSB and CW—plus Crystal Calibrator with front panel control; switch position for WWV for accuracy; AVC tube changed to 6BJ8 for improved TR switch operation. **$299.00**

COLLINS 75S-1 SSB RECEIVER
Sensitivity—1 uv for 10db S/N; Upper and Lower SSB, AM, CW; Broad Position for AM; Crystal Calibrator; 2.1 Mechanical Filter (furnished) and .5 KC available. **$495.00**

COLLINS 32S-1 SSB TRANSMITTER
175 Watts PEP input; 80 through 10 meters; 10 db RF Feedback; Automatic Load Control; Upper and Lower SSB, CW. **$590.00**

CENTRAL ELECTRONICS MODEL 600L
NO TUNING CONTROLS — C.E. BROADBAND Couplers in HIGH EFFICIENCY CLASS AB^2 using single 813. Easily driven to 600 Watts PEP Input by a 20A or 100V. **$495.00**

CENTRAL ELECTRONICS MODEL 20A MULTIPHASE EXCITER
20 watts PEP. Bandswitched 160 thru 10 meters. SSB-DSB-AM-PM and CW. **Wired: $279.50**
Kit: $219.50

NATIONAL NC-303 RECEIVER
Front panel SSB selector with "IF Shift," eliminates retuning or detuning. 5-position IF selector provides sharp, SSB-1, SSB-2, medium and broad selectivity. **$449.00**

ELDICO SSB-100F
All-band 100 watt basic exciter/transmitter completely self-contained. A potent rig by itself, a versatile exciter for Eldico's kilowatt linear amplifier or any power amplifier, commercial or home constructed. **$795.00**

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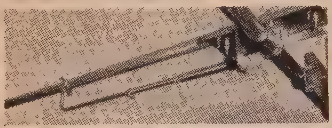
MAIL ORDERS SHIPPED SAME DAY AS RECEIVED
Include with your payment a generous allowance for shipping charges — the excess will be promptly refunded.

For further information, check number 30 on page 126.

Perfect 1:1 SWR

with the NEW hy-gain "monobanders"

GAMMAXIAL Gamma Match System!



Now a feature of all three monobanders, the new, pre-calibrated (GAMMAXIAL) Gamma Match assembly with coaxially formed reactance cancelling capacitor built-in, makes possible for the first time a perfect 1:1 SWR. Coax connector for 52 ohm feed included. Developed by hy-gain's engineering staff and used exclusively in the hy-gain monobanders.

10M - 3 ELEMENTS

18 lbs.
Boom Length: 104"
Longest Element: 17'10"

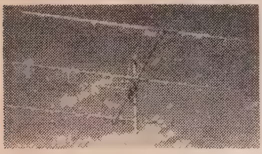
$24.95

15M - 3 ELEMENTS

30 lbs.
Boom Length: 142"
Longest Element: 23'10"

$34.95

20M - 3 ELEMENTS



48 lbs.
Boom Length: 212"
Longest Element: 35'9"

$59.95

Carefully engineered, incorporating the latest design principles for top performance, the hy-gain monobanders are factory pre-tuned and pre-matched. Complete with easy-to-follow instructions for assembly, these beams sold with 1 year guarantee. Features include large diameter elements and ruggedly built Boom/Mast clamps. Booms hot dipped galvanized steel for max. strength with minimum wind resistance. Elements 6061T6 alloy. Extremely simple to put up and into operation.

Average Gain: 8½ db. Average F/B Ratio: 24 db.

SEE THE COMPLETE HY-GAIN LINE AT

ELECTRONIC EQUIPMENT
DISTRIBUTORS
3686 El Cajon Blvd.
San Diego, California
Other Lines of Ham Gear in Stock
Talk to us about terms and trade-ins!

For further information, check number 31 on page 126.

RTTY *[from page 79]*

will soon be back on 3620. W3CRO is ba on 80, but not with the big rig as yet. W3F has the AN/FRR-3 diversity receivers and now should have the companion AN/FGC terminal equipment to go with it.

W4HKB reports that the North Caroli boys can be worked each Sunday morning 7140. W4RHH has built a W6OWP convert W4JSS, ex-W2AOJ, is now OD5CI, and waiting for things to ". . . get normal so can get going again." Scott hopes to be RTTY then.

W6NRM, ex-W9TCJ, the "wizard Wisconsin," (and California), was ask by W2JTP to design that "Morse-to-TT converter so badly needed to transfor W1AW's cw bulletins into 5-unit TTY co for re-transmission by RTTY-OBS statio WA6BQW, ex-W0BPE and ex-W5YTM, h a Model 24, and needs parts.

W7ZNB is building TV-keyers for his Mod 12, and is looking for dope on an electron TD. W7GFT is now /1 in Littleton Commo Mass. W7BEG is now on 14,335.

W9BKA just got a Model 15. W9IHO h acquired an SX-101 and an AN/FGC-1, a is building a W2JAV converter from April ' *CQ*. W9ZGX got his 26 working. W9PU has Models 14, 26, and 19 to go with h W2PAT, W6OWP, and W2JTP converter W9AIH, on 6-meters from Morrison, Illinoi has no trouble working Chicago, Peoria, Ced Rapids, and Des Moines with only 40 watt

K0ILA now has his Model 15. W0HU is getting together his Model 26 and his B 610. K0HEH has an almost complete set weather symbols type and keytops for a Mod 14 that he would like to part with. Drop him line if you are interested.

KR6AK is now on 29,670 late afternoon and on 21,078 evenings, reports WN0B LA1ZG, radio operator aboard the M/S Bla Heron visiting New York, has requested th Norwegian FCC for authority to use fs KL7CAT was heard on 20.

Comments

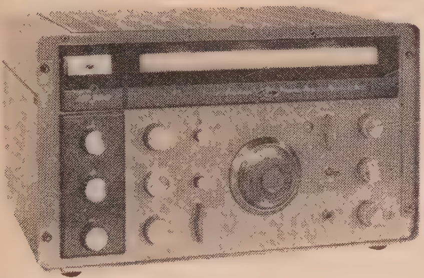
Hope you fellows replied in the affirmati to the FCC's requests for comments o Docket 12607. (See pg 51, Nov. '58 *QST*

RTTY callbooks are available from W6AE 372 West Warren Way, Arcadia, Californi for $1, postpaid. The RTTY Handbook available from W2JTP, 16 Ridge Dr., Hig Hills, Huntington Station, New York, for $ postpaid. Those 88-mh "loading coil" toroid are available from W6CQK, 710 Madiso Avenue, Redwood City, California, for $ each, postpaid.

73, Byron, W2JT

ANYBODY FOR AN EXTRA $50 BUCKS FROM Almo?

JANUARY'S TOP HAM DEAL!



ON THE FAMOUS National "DREAM RECEIVER NC-300"

HAM RECEIVER NC-300

National's famous "Dream Receiver." An extremely sensitive, highly stable receiver with exceptional calibration accuracy. Has eight electrical bands, 160 through 10 meters, plus a special 30-35 mc range used as a tunable IF for 6, 2, and 1¼ meters.

COVERAGE	BAND DESIGNATION AND LENGTH		
	160 meters—	1.8 to	2.0 mc.
	80 meters—	3.5 to	4.0 mc.
	40 meters—	7.0 to	7.3 mc.
	20 meters—	14.0 to	14.4 mc.
	15 meters—	21.0 to	21.5 mc.
	11 meters—	26.5 to	27.5 mc.
	10 meters—	28.0 to	29.7 mc.
	6 meters—	49.5 to	54.5 mc.*
	2 meters—	143.5 to	148.5 mc.*
	1¼ meters—	220 to	225 mc.*

**Usable with Accessory Converters.*

Everyone knows that the NC-300 is one of today's outstanding receivers. It isn't really necessary to list all of its features due to its wide reputation.

Here's our deal—We will give you an extra $50.00 trade-in on your present receiver when you trade it for a new NC-300. For example, if the receiver you now have has a regular trade-in value of $100.00 we will give you $150.00 toward the purchase of the NC-300.

This terrific deal is available at all nine ALMO stores. We cordially invite you to drop in to any ALMO ham shack and take advantage of our limited time NC-300 trade-in special.

If it isn't convenient for you to stop by in person, just drop us a card with the pertinent details, mention the NC-300, and we will gladly quote you by return mail.

$399⁰⁰ LESS YOUR TRADE LESS AN EXTRA $50

BUDGET TERMS AVAILABLE

FEATURES

- Ten dial scales for coverage of 160 to 1¼ meters with National's exclusive new converter provision with the receiver scales calibrated for 6, 2, 1¼ meters using a special 30-35 mc tunable IF band.
- Three-position IF selector—.5 kc, 3.5 kc, 8 kc—provides super selectivity, gives optimum band width for CW, phone, phone net or VHF operation.
- Separate linear detector for single sideband . . . decreases distortion by allowing AVC "on" with single sideband . . . will not block with RF gain full open.
- Exclusive optional RF gain provision for best CW results allows independent control of IF gain!
- Muting provisions for CW break-in operation.
- Calibration reset adjustable from front panel to provide exact frequency setting!
- Dual conversion on all bands!
- Crystal filter with phasing control and three-position bandwidth control!
- Socket for crystal calibrator plus accessory socket for powering converters and future accessories!
- First IF frequency—2215 kc.
- Second IF frequency—80 kc.
- Selectivity at 6 db down 500 cycles, 3.5 kc and 8 kc. Selectable from the front panel without additional accessories! Nothing extra to buy!
- Crystal filter at 2215 kc provides notching plus three bandwidth positions in addition to the three IF selectivity positions. No other receiver has this versatility.

CONVENIENTLY LOCATED THROUGHOUT THE ENTIRE FOUR STATE DELAWARE VALLEY AREA

Almo RADIO CO., 913 ARCH STREET
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TRENTON, N. J. 201 CALHOUN ST.
NORRISTOWN, PA. 550 MARKLEY ST.
SALISBURY, MD. 317 PARK HEIGHTS AVE.

For further information, check number 32 on page 126.

We are pleased to advise that Central Electronics, Inc. has become a wholly owned subsidiary of Zenith Radio Corporation.

The acquisition by Zenith, materially strengthens Central Electronics in its field of amateur, commercial and military electronics, and will enable it to expand its operation substantially.

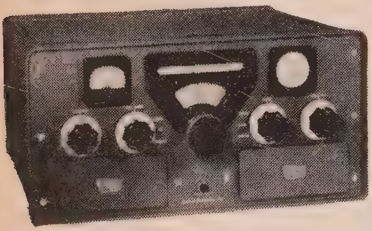
Wesley R. Schum, who founded Central Electronics in 1950, wil continue as a Vice President, and the balance of the personnel will remain as before.

In the future, you can expect the same satisfaction, service and leadership in creative engineering that we have delivered in the past.

Central Electronics fine quality equipment is a natural addition to the Zenith family of high quality products.

SUPERIOR SSB GEAR

MULTIPHASE EQUIPMENT



NEW 100V EXCITER-TRANSMITTER

NO TUNING (except VFO), uses famous CE BROADBAND system. PRECISION LINEAR VFO—1KC Calibration. Single Knob Bandswitch 80 thru 10. SSB—DSB—AM—PM—CW and FSK. RF Output adjustable 10 to 100 Watts PEP. Meter reads Watts Input, Amps Output and Carrier Suppression. 2" RF Scope. Speech Level and Load Mismatch Indicators. Audio Filter — Inverse Feedback — 50 db Carrier and Sideband Suppression.

IN PRODUCTION SOON..... ..... PRICE $595.00

MODEL 600L BROADBAND LINEAR

NO TUNING CONTROLS — CE BROADBAND Couplers in HIGH EFFECIENCY CLASS AB^2 using single 813. Easily driven to 600 Watts PEP Input 160 thru 10 by a 20A or 100V. Built-In HEAVY DUTY POWER SUPPLY — 45 MFD PAPER Capacitor. Meter reads WATTS INPUT, GRID DRIVE, RF AMPS, and SWR. Completely shielded — TVI suppressed — parasitic free. REMEMBER there is LESS than ONE S UNIT difference between the 600L and a 2 KW PEP job. ....PRICE $495.00

THESE MULTIPHASE EXCITERS PIONEERED AMATEUR SSB

MODEL 20A

MODEL 10B — 10 watts PEP. Plug-in coils 160 thru 10 meters. Perfect voice control on SSB—DSB—AM and PM — CW breakin. Carrier and calibrate level controls. 40 DB suppression.

Wired.......$179.50 Kit.. ....$139.50

MODEL 20A — 20 watts PEP Bandswitched 160 thru 10 meters. SSB—DSB—AM—PM and CW. Magic eye monitors carrier null and peak modulation. Ideal for driving AB1, AB^2, and most Class B linears.

Wired... ..$279.50 Kit. . ..$219.50

MODEL 10B

Central Electronics, Inc.

1247 W. Belmont Ave. Chicago 13, Illinois

For further information, check number 34 on page 126.

SIDEBAND [*from page* 80]

Munich. We welcome LA6VC who was working many stations when first heard this month.

John, OH2YV writes, that as a result of reading about Cliff, K9EAB in my October column, the "Award Hunters' Club" will make Cliff an honorary member. John is the secretary of the organization. The award will be made in a few days. Congratulations, Cliff!

We are pleased to welcome Eva and Alex of CN8MM to this country for a short visit. Eva, as every one knows was the winner of CQ's First and Second World Wide SSB DX Contest. Harry, W2JXH and Bing, W2CMM went to the airport to welcome Eva and Alex yesterday. They were overly anxious to meet the visitors and unknowingly walked into the quarantine room while seeking them. As a result they were both vaccinated for small-pox. With the resultant sore arms both Harry and Bing are glad they are not CW operators.

Evidently the QSL situation is still slow because we only awarded eight "Worked 100" certificates in November. We also awarded 16 "Worked Fifty" and 19 of the "Worked Seventy-five" parchments this month.

In the next month's column we will announce the Third Annual CQ SSB DX Contest with new rules which we hope will make it more enjoyable and also place contestants on an even basis regardless of their location. We are looking for a date possibly in April which will not conflict with other schedules. Get ready for this one which should be the biggest affair yet. We are also consulting with George Jacobs to pick a period with good DX conditions.

As previously announced we will continue to list the stations who have qualified for the "Worked 100 Countries Two-way SSB" awards. We hope to be able to add your call to this select group.

73, Bob, W3SW

CLINIC [*from page* 83]

(rubber-spring) socket. They report good results. (See the note on the 183 above which could apply.)

Antenna for 75 Meters

"I have about 160 feet of useable antenna space and I'd like to work 75 phone. What's your recommendation for a good antenna?"

A good ½ wave doublet; it's hard to beat.

Ground Plane

"Is a well designed ground plane a good antenna for the 6 meter band and will it give me some DX?"

Yes. If it is designed properly it will have a low angle of radiation and work pretty well.

[*Continued on page 106*]

KEN-ELS RADIO SUPPLY

$249

Automatic clock timer $10 extra

HAMMARLUND HQ-110

Strictly for the amateur. Tunes 6, 10, 15, 20, 40, 80 and 160 meter bands. Q-multiplier. Crystal calibrator. Highly efficient noise limiter. Separate linear detector for SSB and CW. Electrical bandspread. Separate BFO oscillator. Crystal-controlled dual conversion. 12-tube superheterodyne circuit. Auto-response audio system.

$189

Automatic clock timer $10 extra.

HAMMARLUND HQ-100

General purpose communications receiver continuously tunable from 540 KCS to 30 MCS. Outstanding sensitivity and selectivity. Q-multiplier. Excellent stability. Electrical bandspread. Noise limiter. "S" meter. Auto-response.

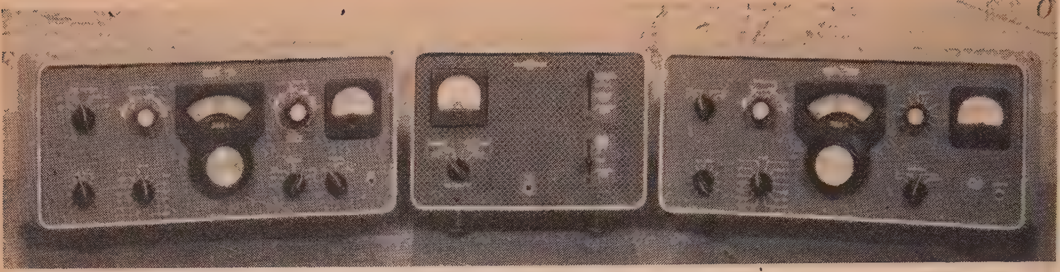
W0ZKD—Glen
W0ZCN—Ken
Fort Dodge

428 Central Ave., Fort Dodge, Iowa
Phone: 5-2451

W0CRP—Russ
K0ABO—Rog
Cedar Rapids

67 16th Ave., S. W., Cedar Rapids, Iowa
Phone: EM 4-1172

For further information, check number 35 on page 126.



it's here

The new Collins S/Line

now at EVANS RADIO featuring only the best at lower prices with liberal trade-ins and easy terms

Quality, advanced design, and high performance are yours in the new Collins S/Line. Incorporates simplified SSB design with superior frequency stability and selectivity.

Call, write or stop in. Evans stocks a complete line of Collins SSB equipment and accessories.

Liberal trade-ins, easy time payment plan. Now's the time to place your order, and be on the air soon with Collins S/Line.

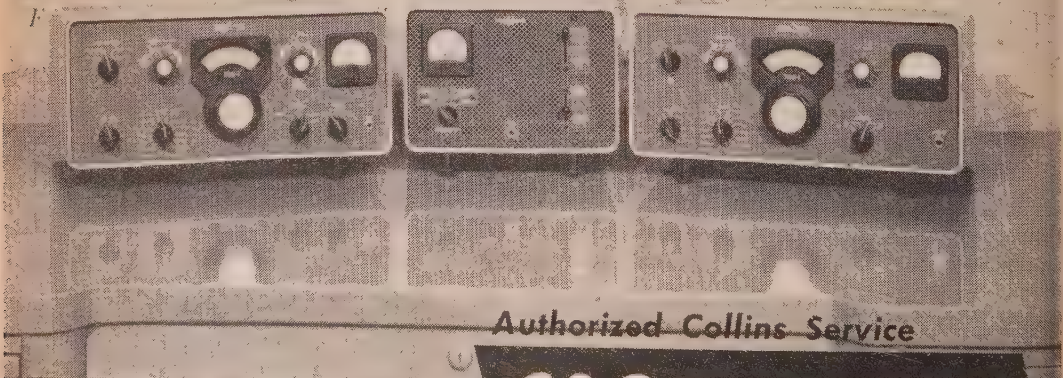
32S-1 Transmitter	$590.00
75S-1 Receiver	$495.00
312B-4 Speaker Console	$185.00
312B-3 Speaker	$ 27.50
30S-1 Linear Amplifier	$1470.00

EVANS RADIO
P. O. Box 312
CONCORD, NEW HAMPSHIRE

For further information, check number 36 on page 126.

IN STOCK AT C and G

Easy Terms • High Trades • Fast Service

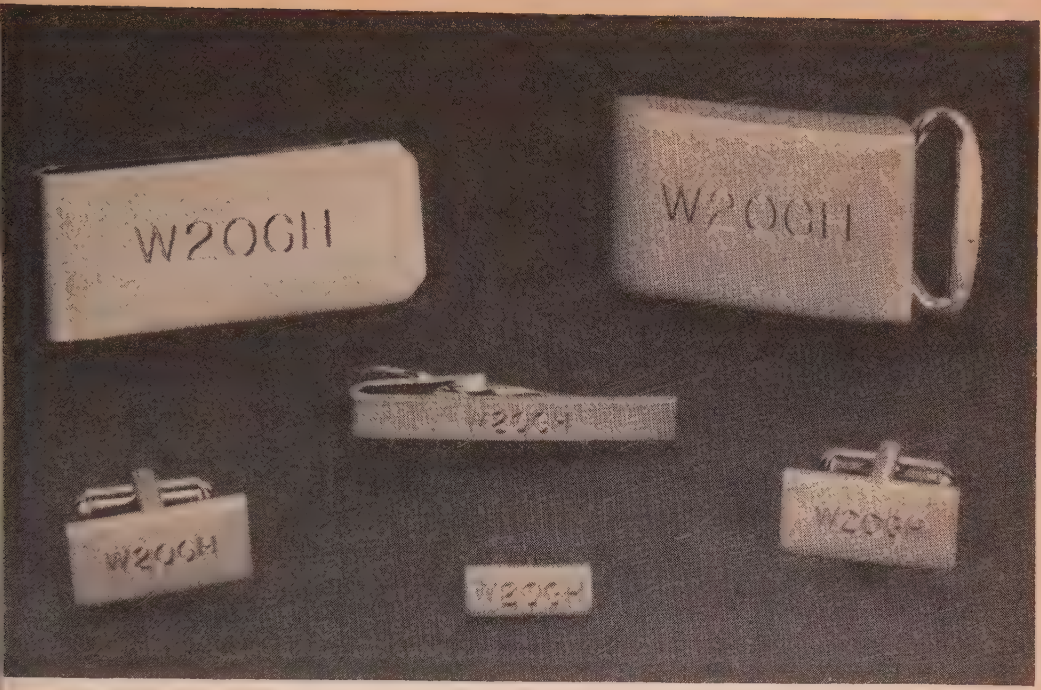


Authorized Collins Service

WRITE ▸ WIRE ▸ CALL
Ask for latest free Used-Surplus list

C&G RADIO SERVICE CO
2502 JEFFERSON
TACOMA 2, WASH.
Phone
BR 2-3181

For further information, check number 33 on page 126.



HAM JEWELRY

Now, for the first time, a complete line of personalized jewelry handsomely engraved with your call letters. All items available in choice of gold plate or silver plate. Sandblast finish insures long wear.

Money Clip	**$3.50**
Cuff Links	**3.50**
Buckle	**3.50**
Tie Bar	**2.50**
Tie Tack	**2.50**
Lapel Pin	**2.50**

Add 10% Federal Excise Tax to all items

SPECIAL—Genuine top-grade Moroccan leather wallet, handsomely designed with your call letters in gold. Also available in ident-card carrying case. Wallet and card case. Each $5.00

CQ-12

Hewlett Sales Co.
Box 600CQ
300 West 43rd St.
New York 36, N.Y.

SIRS: My check (money order) for $ .... is enclosed. Please send

Money Clip ☐ Buckle ☐ Tie Tack ☐
Cuff Links ☐ Tie Bar ☐ Lapel Pin ☐

NAME .... CALL ....

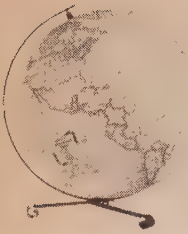
ADDRESS ....

CITY .... ZONE ... STATE ....

New York City residents add 3% Sales Tax

For further information, check number 37 on page 126.

THE HAM SHOP



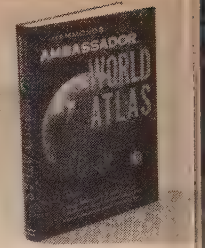
GLOBE

We can't see how you can get along without this beautiful 19-inch, 8 color World Globe. It can be yours, including a one-year subscrip-to CQ for: lighted model W/bulb $24.95; unlighted model $19.95.

ATLAS

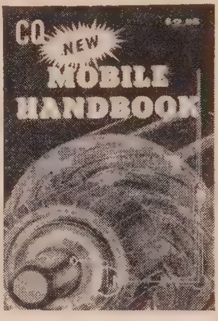
Come on, get with it. Don't pull a blank when some one asks you for the capital of Honduras. For only $12.50 you can own 7 lbs. of full-color maps and a complete gazeteer. Send for this Hammond Atlas. PLUS a one year subscription to CQ.

only $12.50



COMMAND SETS

This IS a collection of reprints, containing all of the available information on the conversion of the popular "Command" transmitters and receivers into good ham transmitters and receivers. Invaluable for Novice, Technician, General, Advanced and Extra class operators. 136 fabulous amazing terrific pages for only $1.50 PPD.



MOBILE HANDBOOK

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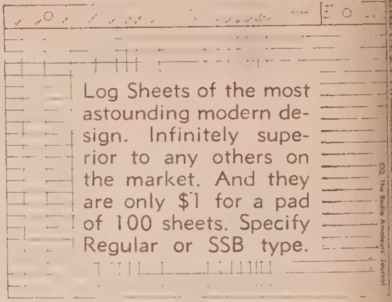

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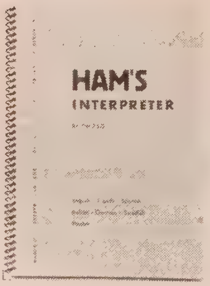

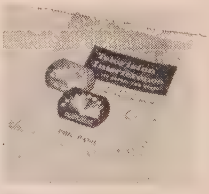

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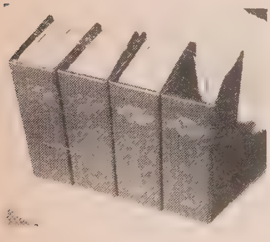
W1DBM's newly written TVI boo (no reprints) covers all aspects o curing TVI from both the Ham's viewpoint and that of the TV viewe or the TV serviceman. It includes 2 and 6 meter TVI as well as Industrial Medical and Utility TVI. Profusely illustrated with diagrams, photos charts tables and FCC regulations pertaining to radio and television interference. Price: $1.75 postpaid, USA, $2.00 Foreign.



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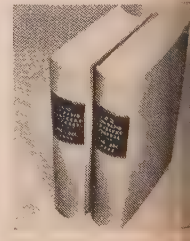

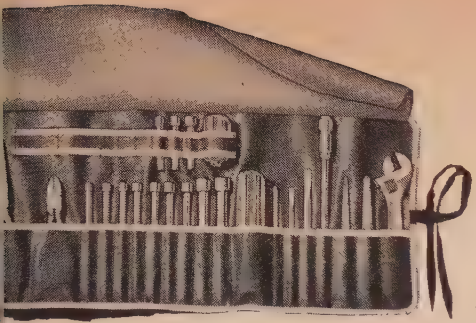

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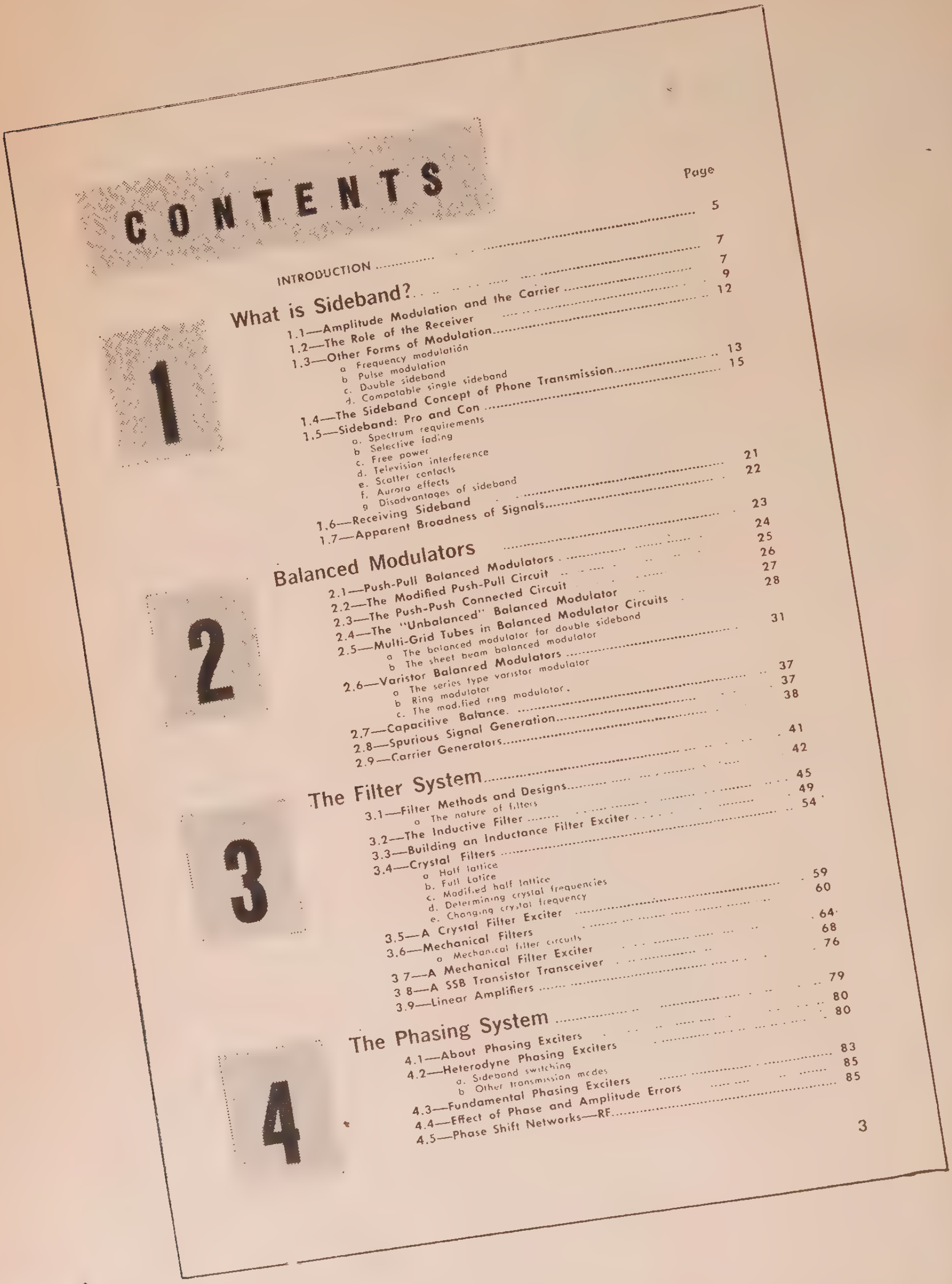

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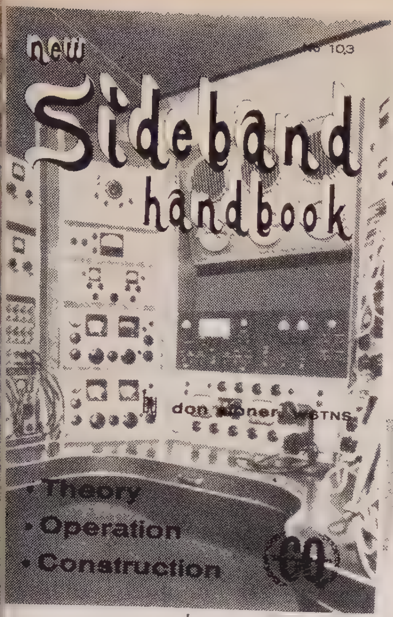

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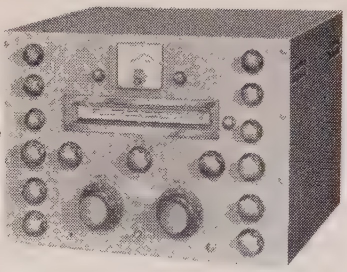

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HAM CLINIC

[*from page 99*]

Be sure it is at least a ¼ wavelength above ground.

Choke Connection

"Why is it in some diagrams I have seen of power supplies that the choke is inserted in the negative rather than the positive side?"

To prevent or reduce the possibility of high-voltage breakdown between the core, case and choke winding.

VHF Triodes

"Can you tell me why triodes instead of pentodes are used in VHF amplifiers? It seems to me that pentodes would give greater gain at the higher frequencies."

Lower internal noise and about equal gain with pentodes are characteristic of the currently used VHF triodes.

110V Generator Noise

"I live on a farm and use a 110V AC generator to operate my ham equipment. The generator has always had a little noise in it (which can be heard in my receiver), but a couple of days ago, this noise got so loud I can barely hear anything now. What's the answer?"

First, if you have been using this generator for some time, I'll bet that vibration has shaken various grounding connections loose. Check all strap grounds between generator and frame. Try re-positioning of brushes (for minimum noise) while listening to the receiver (if possible). Then if your brushes have not been by-passed, by-pass them with 1 or 2 mfd (*dc* portion of your plant). On the *ac* portion take a good look at the slip-rings, make sure they are riding firmly and evenly. Re-locating your main ground may help too. Remember: you have ignition noise too to worry about.

By-pass

"Can you tell me the real reason for by-passing a cathode resistor?"

To prevent degeneration. That is, when there is *ac* flowing through the resistor (part of the plate current) there will be a voltage drop caused by it and it will be degenerative. A condenser with lower reactance than the resistor value prevents this degeneration.

Antenna Efficiency

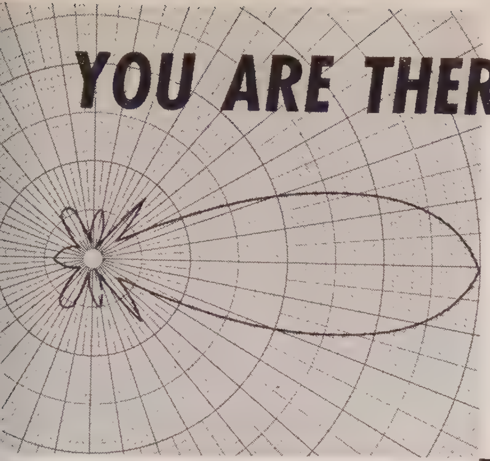
"Does the increased height of an antenna make up for the losses of the long transmission line needed to feed it?"

Generally no. However, it depends upon the antenna and its overall gain.

Hy-Gain Antenna

"What is your personal opinion of the *Hy-gain* 20 meter 3 element beam?"

As advertised, it has an average gain of 8½ *db* with an average front-to-back ratio of 24 *db*. The longest element is about 35 feet 9 inches and requires a boom length of 212″. Although



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have never used one, reports indicate that it orks exceedingly well. I personally think that r $59.95 you simply can't go wrong.

& W Balun Coil

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Write *Barker & Williamson, Inc.*, Canal reet and Beaver Dam Road, Bristol, Penn., d ask for info relative to their Model 725 lun which sells for $19.50. It's tops! This is universal coil and will handle up to 4kw on B.

17 Mike

"In September CQ (1958) I read your pic- rial article on the T-17. Pray, mister (sic) here are these T17s?"

A number of surplus stores still carry them. sure bet is the *G & G Radio Supply Co.*, 53 sey St., N. Y. 7, N. Y. They offer them ed at $4.95 and new at $7.45.

Twist

Old plastic tooth brush handles have worked t very well as small coil supports. One end already drilled. Simply cut off the required ngth, shape, and drill another hole. The coil is fastened to the handle with Duco cement. Two stand-off insulators complete the mounting.

Thirty

To all of you wonderful hams—throughout the entire world—Ham Clinic wishes you a very happy, peaceful and a DX-full New Year.
73, Chuck W6QLV.

NOVICE *[from page 85]*

me, with a S. A. S. E. Bud reports hearing the following stations in Thule, Greenland: Oct. 9, 1958—2100-2400: KN1DXA, HIS, KN2AQF, KYH, TIB, KN3EMT, KN4GZL, KN8KIX, KSK, KUI, I DC, LQO, KN9LBZ, OPI, KN0QDX, PDE. Thanks for the fine report, Bud, hope to see you again next month.

Help Wanted

George Martin, K5EKQ/6, U.S.S. Leader, MSO-490, FPO-San Francisco, Calif. offers to help anyone working on a ticket.

The following persons would like help obtaining their Novice license:

W1—Steve Hammond, Edmund Rd., Marsh-

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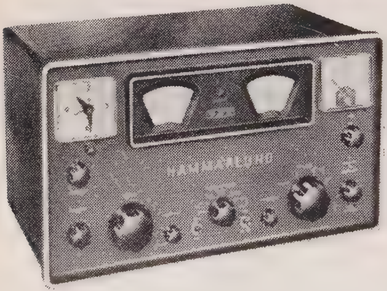

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field, Mass., Telephone TEmple 4-7713.

W4—Albert Surner, 246 So. 8th St., Gadsden, Alabama, Phone LI-35758.

W. J. Wilson, Jr., 403 Forest St., Durham, N. C., Phone 38923.

W6—C. H. Corp., P. O. Box 9383, San Diego 9, California.

W8—John Champa, 1542 Wyandotte Rd., Columbus 12, Ohio.

Letters

Stuart Clark, WV6BTK, 1064 Seward Way, Stockton 4, California leads off this month. Stu has been on the air since Oct. 7 and has worked 20 stations at this writing, with an HQ-110, Globe Chief, and doublets for all bands.

Horace Butterworth, K3AKB, 2708 Gaither St. SE, Washington 21, D.C. will be glad to sked for WAS (D.C. also counts as Md.). Please include a self addressed stamped envelope with your letter.

Dave Oakley, 1506 Jefferson, Carlsbad, N.M. holds call KN5PMF and dazzles 'em with a home brew 60 watter, AR-3 and has worked 36 states plus KH6 es LU2. He will help prospective Novices and would like skeds with KN1, 4, and 0.

Lloyd J. Peterman, KN9PDJ, RFD ♯4, Sturgeon Bay, Wisconsin, runs a DX-40 into a 8 meter antenna and uses an AR-3 for hi "ears," and operates on 3741 kc. Lloyd's firs contact was with KN3DII which helped to pu his WAS at 8.

Len, W8WT, advises us that K8JXK o Birmingham, Mich., is only 10 years old bu handles the mike and key like a "pro." He ha been licensed about a month and has 40 countries already. His mom and dad are Novice and sis may get one, also.

Larry Warner, KN5SNA, 1005 Wanda Dr. Bossier City, La. is "bombing" them with a homebrew 18 watt rig and S-38E on 716 Larry's dad promised him a DX-40 if he get that ole General ticket by Christmas. Hop you make it, Larry!

Ray Richards, K8ILO, 4070 16 St., Wyandotte, Mich. has worked 9 states in 4 wee on the six meter band using a home brew element beam, converter and BC-348L. Ra will sked for any reason. He adds, "W8IL has the same last name, I wonder how ofte this happens?"

An XYL graces the column this month. Cor Kitrell, KN0OBX, 4639 Holdrege, Lincol Nebraska has worked 38 states and a VE with her Viking Adventurer, and 75A4 hea ing aid. A 3 element Hi-Gain Three elemen beam helps too. Cora will sked with anyon needing Nebraska. Look for me on sideban Cora.

Roy, K5OEW, forgot to include his QT probably because he was so excited at dro ping the "N." Roy still operates 80, 40, an 15 and has 26 states worked and a WAC

plush) one. He says "I have answered every-
ing from AC3 to 9S4 with NIL results."

Mac (F.T.) McAllister, W8HKT, P. O. Box 66, St. Joseph, Michigan sent in a f.b. con-ersion for the Heath AM-2 so that it can be *vitched* from 52 to 72 ohm coax. Look for n article by Mac in CQ soon.

Mike Lee, KN5PYX, Box 474, Laurel, Iiss., has worked 15 states and a VE3 with DX-20 exhaler and a Knight Ocean Hopper haler, and hopes to be on 15 soon with a 53A. Mike would like skeds with 1's, 2's, s and 7's.

Glenn Williams, Rt. 2, Box 56, Manteca, alif., is an almost Novice and will be on the r with a BC-454/455 and a home brew 35 atter, by the time you read this. Glenn would ppreciate coil information from someone own-g a Knight 50 watter.

Don Johnson, 3527 Knox, N., Minneapolis , Minn. forgot to mention his call, but he ould like skeds with Del., Mont., N. Mex., olo., and particularly a Novice or General Alaska. His 15 meter freq. is 21.132.

Buddy Hart, KN6MQX, 121 Nevada St., royo Grande, Calif., has made 150 con-cts in 3½ months of operation with a home ew 25 watter and S-85 receiver hooked up a 65 foot end-fed antenna. Buddy can be from 7155 and 7173—40 only.

Denis Christopherson, KN9JIG, RR #1, Elk ound, Wis., picks off the DX with a DX-35 d an HQ-110. Antennas are a 3 ele. 15 meter am and doublets for 40 and 80. Denis only eds Vt. and Nev. for WAS (Alaska later). w about some help, fellows?

Lowell Avery, 6106 Franklin St., Omaha Nebr., will sked anyone needing Nebr. for AS and will be using a Globe Chief and 3A on either 40 or 15. He has 23 states l a VE3 but would like skeds with WH6 or 7.

And that brings us down to the bottom of stack for another month, fellows.

73, Don, W6TNS

VEEP GEN [*from page 49*]

that happened to be handy. It tuned to ut 18 megacycles with the 50 mmfd. capaci- shown. This frequency was satisfactory for cking my receiver, but it might be desirable change this frequency for some purposes. s can be done by varying the value of 50 mmfd. capacitor or by changing the of the coil. Changing C_x moderately will affect the oscillator frequency to any great nt although it will change the amount of ep. As the 50 mmfd capacitor is made er in relation to C_x, the sweep will tend to ease. For this reason it is possible to do e a bit of juggling and get quite a variation weep range.

s mentioned before, an oscilloscope must ised with this generator. The output of the

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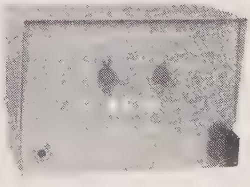

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CRYSTALS inc.

ACCURACY DEPENDABILITY QUALITY
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Not surplus! New quartz ground and etched to your exact specified frequency. Checked on HP cycle counters.

1500 KC to 2000 KC..........$2.00 ea. postpaid.
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Plated type in FT241A holders. All channels 370 to 534 KC (except 500 KC) $1.00 ea. postpaid. 500 KC $1.75 ea. postpaid.

Channel Groups Accurately Matched, No Extra Charge.

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Supplied in very thin FT243 holders. Order by fundamental frequency. $2.00 ea. postpaid.

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Satisfaction Guaranteed or Your Money Back!
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For further information, check number 40 on page 126.

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Hermetic sealed HC-6/U holders. Pin dia. .050 or .093. Exact frequency as shown — .005% Tol. at 32 mmfd.

$1.00 EACH

*2515.000 KC
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6887.500 KC
*7500.000 KC
7637.500 KC
7850.000 KC
8137.500 KC
*8183.333 KC
*8258.333 KC
*8387.500 KC
8616.666 KC
8637.500 KC
8850.000 KC
8887.500 KC

*1000.000 KC	HC-6/U	.005%	$4.00
*1000.000 KC	HC-6/U	.01 %	3.50
*1000.000 KC	DC-9 for BC-221		5.50
*1400.000 KC	HC-6/U	.005%	3.00
*2000.000 KC	HC-6/U	.005%	3.00
*5000.000 KC	HC-6/U	.005%	2.50
*15000.00 KC	HC-6/U	.005%	3.50

*Limited quantity

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Crystals in special thin holders correlated for new Gonset equipment 8230.000 KC=chan #7 & All other frequencies—.005% $2.50

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TERMS: Minimum order $2.50. All orders must be accompanied by check, ca h or M.O. with payment in full. NO COD'S. Add 5¢ per crystal for postage and handling. All items subject to price change and prior sale.

device being tested should be connected to th vertical input of the scope. In this way th scope will display the response of the circui with the frequency indicated by the displacement in the horizontal direction while th vertical displacement indicates the response o the circuit under test.

The biggest advantage of this generator aside from its simplicity, is the fact that it ca be used to check the response of sharp filter without ringing. This is accomplished by usin a slow sweep rate. If the scope sweep is reduce to about 10 cps it is possible to check all bu the sharpest filters. A faster sweep is satisfactory for an ordinary receiver i.f. strip. I is necessary to compromise between slow swee rate to reduce ringing and a faster sweep rat to give a continuous trace.

In the event you may have other ideas fo these ceramic capacitors, you may find th following information of use. This cerami material's dielectric constant is temperatur sensitive and voltage sensitive. The dielectri constant may increase by a factor of six o seven as the applied voltage is varied. Th change in capacitance is not linear at lo applied voltages or very high applied voltages I cannot verify the part about high voltage but it should be reliable since it came from 1954 issue of *Research* magazine. The chang in capacity will follow af variations and possibl higher frequency variations.

LOADING [*from page 47*]

negative region, the cathode becomes negativ with respect to the plate. The diode conduct closing the switch, and the resistor is shunte across the secondary. In this manner a co stant load is presented to the class B stag during the entirety of the negative portion o its swing. Gone is the wildly unloaded cond tion. Gone are the transients.

And—since some of the negative cycle pow is being dissipated in the resistor—definite gone is the problem of negative peak splatte

The suggested value of R will provide th proper loading of the negative cycle in mo cases; however, should your transmitter co tinue to push negative peaks beyond the 90 level, merely decrease the value of R by small amount, say 15%.

Do *not* overdo it, thinking that you will b gaining greater audio punch. It is the avera variation in amplitude which determines yo "punch," measured from the positive peak the negative trough. Keep that trough dow around 90%.

It has been said by deprecators of this sy tem that it requires more audio power modulate the carrier. This isn't so. Rememb that your regular class B meter has, in th past, been reading the *average* of curre drawn by two tubes. One was drawing hi urrent, the other a smaller amount. The averge, then, was a figure less than that normally rawn by the positive-cycle tube in producing 0% to 100% positive modulation. Once you ring the current of the other tube up to this ame level by loading it properly, the average f the two will, quite naturally, be higher. Jsually by about 40%. But this higher reading oes *not* mean that more audio power is being equired.

There are bonuses to be gained through the se of Negative Cycle Loading. Assuming that our transmitter is capable of handling the ower without distortion, you will find that ou can push your positive peaks considerably bove 100% without exceeding 90% in the egative direction. And without splatter.

Practicality will limit your actions in this atter, however. Receivers CAN be overaded, and your fellow hams should be condered. You'll recall that we started off by scussing the acceptability of your on-the-air ersonality as expressed through your moduted carrier. Above all, keep it clean.

Well, there it is. Technical terms and diaams have been studiously avoided during is trip. We've been "flying by the seat of our nts." But, in the long run, isn't that the st way? Isn't it the end results which count?

Here's proof of the pudding. The transmitter W6PQW has been *thoroughly* checked by cals in on-the-air checks with signals in the 9 plus 20 to 30 db range. These locals are out evenly divided in their reports.

Half say that audio can be detected approxiately one kilocycle beyond the edge of the rrier. The other half says that *nothing* can detected beyond the carrier.

Negative Cycle Loading is the name. Let's t every phone signal on the air to using it. ■

WER PLANT *[from page 45]*

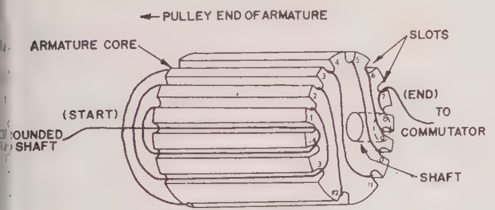

Fig. 4—Armature winding procedure. Only one turn is shown in each pair of slots for simplicity. Half of the coil in slots 4 and 11 is run on each side of the shaft to preserve mechanical balance.

e of the generator frame. Reassemble the erator.

Note: Do not replace the *grounded* brush, e we are now using a slip ring and this sh would short the output to ground.

he generated ac comes out at the uninsu-

Again in this issue a new section appears in CQ where distributors may advertise trade-in and reconditioned equipment. This section, called the TRADING POST, will be confined only to legitimate ham distributors as a means of announcing the many excellent used items available. $15 per column inch.

Reconditioned equipment:—KWS-1 $1300, KWM-1 & all acc. $1100, 32U3 $400, 75A1 $250, SX-100 219, SX-99 $100, S-77 $49, S-40A $60, HQ-129 $124 up, HQ-140X $174, Pro-310 $295, NC-300 $270 & up, NC-98 $105, CE-B Slicer $49, 10B $110, P-400-GG $139 & up, 51SB-B $175, DX-100 $175, DX-35 $45, AR-2&3's $20 & up, WRL 680 $65 & up, 90A chief $40 up—6% financing write for complete list—**AMATEUR ELECTRONIC SUPPLY, 3832 West Lisbon Avenue, Milwaukee 8, Wisconsin. Ph. WE 3-3262.**

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GRP-90, GSB-I, Speaker	$ 425.00
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HRO-60, Cal. Spkr, 8 coils	$ 395.00
Johnson FIVE HUNDRED Transmitter	$ 595.00
Johnson Courier Linear Amplifier 500 watt	$ 210.00
Johnson Pacemaker SSB	$ 345.00
HQ129X w/xtal cal.	$ 129.00
Collins 32V-I Transmitter	$ 295.00
Collins KWS-I & Power supply	$1150.00
Gonset Communicator, 2 meters, 6 volts	$ 129.00

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Shipped on approval. Terms financed by us. Hallicrafters S38 $29.00; S85 $89.00; SX99 $119.00; SX96 $189.00; SX100 $229.00; HQ100 $139.00; HQ110 $189.00; HQ140X $189.00; HQ150 $229.00; National NC 98 $99.00; NC300 $279.00; HRO50T; HRO60; NC183D; Globe Scout $69.00; Viking II $199.00; Ranger; Valiant; Pacemaker; Thunderbolt; Heath DX35; DX100; Collins 32V; 75A2; 75A3; 75A4; etc. Many other items. Write for free list.

HENRY RADIO, BUTLER, MISSOURI

JANUARY SPECIALS

The following items top quality reconditioned and demonstrator items. B & W 1000A Linear, $395.00; Central Electronics 10B, $119.00; 20A, $199.00; 600L Linear, $325.00; Eldico SSB-100A, $395.00; SSB-1000A Linear, $425.00; Elmac PMR-6A, $59.00; PMR-7A, $119.00; Gonset Communicator II—6 meters, $135.00; Communicator III-2 meters, $189.00; Johnson 6N2, $129.00; Ranger, $195.00; Navigator, $139.00; Viking II, $199.00; Valiant, $349.00; 500, $649.00; WRL Chief 90, $55.00; 90A, $60.00; 680, $90.00; 400C, $239.00; Hallicrafters SX-62A, $219.00; HT-32, $549.00; National NC-66, $90.00; NC-109, $149.00; NC-183D, $249.00; NC-300, $275.00. Also many standout values in smaller units.

Write for our new cataog No. 758.

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Box 746, Watertown, South Dakota

100 WATT TABLE-TOP XMTR.

Famous Collins ART-13. Range: 2,000 kc-18 mc. AM, CW, MCW. Auto-tune system rapid change to any one of 10 preset channels, and/or manual tuning. Has speech-amplifier/clipper which uses either carbon or magnetic mike. VFO is the famous PTO of Collins for high stability and accuracy. Built-in crystal controlled callibrator. Uses PP 811's to modulate an 813 in the final at 90%. Output PI coupler permits using practically any type of antenna. Requires external power pack. Size: 11″/12½″/23½″. Net weight 66 lbs. Gov't cost $1800.
Like new, with all tubes.......... **$59.50**

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15 Tubes 435 To 500 MC Can be modified for 2-way communication, voice or code, on ham band 420-450 mc. citizens radio 460-470 mc, fixed and mobile 450-460 mc. television experimental 470-500 mc. 15 tubes (tubes alone worth more than sale price!): 4—7F7, 4—7H7, 2—7E6, 2 6F6, 2—955 and 1 -WE316A. Now covers 460 to 490 mc. Brand new BC-645 with tubes. Dynamotor, mtg. base and control box.......... **$32.50**

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BC 191 100 WATT TRANSMITTER, 200 kc to 18 mc. New, complete with tubes, but less tuning units.......... **$17.50**

3 CM. RADAR XMTR.-RECEIVER. Wonderful item for experimenters and researchers. With parabolic antenna, magnetron, and approx. 50 tubes. Good condition. 450 lbs. Govt. cost over $5,000 .... Only **$45.00**

All prices are FOB Brooklyn, N. Y. Send deposit 25%, bal. & shipping charges COD.

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CHAS. ROSEN **Phone: CAnal 6-4882**

For further information, check number 41 on page 126.

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AMATEUR SPECIALS

All Orders Postpaid

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Soldering Iron TL-601, 6/12 VDC 10 ft. cable, battery clips and sw. Quick-heat, heavy duty thru-out.......... $3.95

Globar non-ind res 600 ohms 118 W. Use 12 in parallel to make 50 ohm 1.4 KW dummy load $1.25 ea. or 12 for $12.00

Plug-in trigger amp. p/o AN/PDR-27C radial set. Contains 3. CK5O2AX tubes plus precision parts. While they last ea. $ .99

RCA 931A photomultiplier tube $2.65 ea. or 2 for $5.00

Satisfaction Guaranteed

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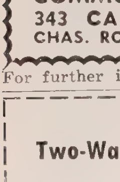

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FOR roller inductances, INDUC-TUNERS, fine tuning gear reducers, vacuum and other multiturn variable condensers. One hole mounting. Handy logging space. Case: 2″ x 4″. Shaft: ¼″ x 3″. TC 2 has 2⅛″ dial—1⅝″ knob. TC 3 has 3″ dial—2⅝ knob. Black bakelite
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Add 8¢ for Parcel Post

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lated brush and the frame ground. When replacing the "hot" brush, include a large solder lug under the pigtail screw terminal for connecting the output lead. Well—there's your ac generator!

Assembly

My putt-putt is built on a 2″x10″ wood base about 2 feet long, using carriage bolts for mounting the components. An angle iron frame would really be nice, if you have the facilities for making one. Mount things solid, because the vibration will shake the parts loose in nc time if you don't. Addition of a shock-mountec base will reduce the vibration problem.

Wiring follows the mechanical construction. *Stranded* #12 rubber or vinyl covered wire is highly recommended. Tape together paralle running leads for mutual support, and faste as often as practical.

Testing and Adjusting

The first thing to do is get the engine running and adjust the generator speed to abou 3600 rpm. Be sure you have **adequate ventilation** because CQ doesn't want any reader asphyxiated! Connect a 100 watt bulb to see i anything comes out at the start. Chances are i won't. While it is running, connect a 6 vol battery across the field terminals with th polarity corresponding with the rectifier output If the lamp doesn't light immediately, it i either due to a burned-out bulb, incorrect wiring, shorted armature turn or turns, or an ope field winding.

Assuming it lit, disconnect the 6 volt battery If the lamp goes out, try reversing the primar *or* secondary phasing of the transformer. Current flowing to the load should *increase* th field voltage output. The secondary tap shoul be adjusted to give the best voltage regulatio characteristic. The absolute voltage level unde load is adjusted by engine speed and R2. R affects the voltage with a small load (or n load) and also determines how well the generator builds up initially.

Next, take the load off and watch the voltag If it soars, R1 is too small. The voltage shoul drop off to between 30 and 100 volts. A loa of about 75 watts should bring the voltage t 115. If you expect to ever use less than 7 watts load, I would suggest another resisto across R1, through a switch (shown dotted o the schematic). This resistor would be adjuste to bring the no-load voltage up to 115.

For 60 cycles, the generator speed must b 3600 rpm. If the voltage output is low an can't be brought up otherwise, the speed coul be raised until it comes up. Most ham gear not critical on line frequency, so the speed ca be adjusted over quite a range. The speed regulation of the engine is critical with respect t the voltage regulation characteristic. The bett speed regulation, the better the voltage gulation.

Noise Elimination

oise in my unit was eliminated by:

(1) Bonding all component frames electri- lly together with heavy wire.

(2) Bypassing the brush with a 0.01 mfd c ceramic capacitor.

(3) Installing a resistor or shielded spark ıg.

line filter was added for good measure.

General

To get maximum power out of this putt-putt, engine pulley size should be adjusted so that engine is operating at maximum efficiency the speed you wind up with for the generator. mine, it is 4″. A little experimenting will the story here.

I found my engine impossible to start in cold ather because of the stiffness of the oil. 10W- all weather oil cured this nicely. Fuses are t necessary, because any overload causes the d excitation to drop to limit armature current a safe level. This is nice in that if you get hort while you are operating, all you have to is clear it and your power comes on again hout having to replace fuses or restarting putt-putt.

The unit is light enough for one person to ndle, and fits inside the trunk of the car along h the rig, receiver, Conelrad monitor, etc., s a five gallon can of gas and some room to re. Five gallons of gas will power the sta- n for over 15 hours.

If you have read this far, you are probably erested in building one of these contraptions. pe you get as much out of yours as I am ting out of mine. ■

1%¢** [*from page 42*]

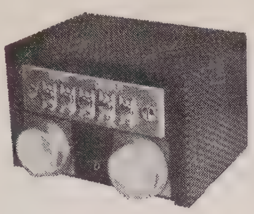
u want *my* card. I didn't ask for yours.

Now, I know very well that some of you will d this. Some will heed the advice and polish their operating procedures. Others, equally lty, will say "he surely knows what he's king about, but, of course, that doesn't apply me."

I'm going to end this up with an actual QSO ad with a W3. He came back to me like s: "WØ——de de W3———R R R pse QSL QSL pse QSL adrs hr is xxxx xxxx pse L pse QSL pse QSL 73 pse QSL WØ——de 3——SK." And that was his one and only nsmission.

I've got a name for guys like that, but CQ uldn't print it. If this hits home, and you n't want to be an unprintable, study up on ır operating habits. Remember, it could be U. ■

TRANSISTORIZED



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- NO ARCING — NO HASH
- EFFICIENCY ABOVE 80%
- COMPACT SIZE — 2½″ x 3½″ x 4″

60 CYCLE INVERTER SLIGHTLY LARGER

SEND FOR BULLETIN 5874-A

WRITE FOR NAME OF YOUR NEAREST DEALER OR ORDER DIRECT

MODEL CA-0631-05: INPUT 6.3 V.D.C. 50 WATTS OUT AT 300/150 V.D.C.	$45.00
MODEL CA-1231-10: INPUT 12.6 V.D.C. 100 WATTS OUT AT 300/150 V.D.C.	$49.50
MODEL CA-1252-10: INPUT 12.6 V.D.C. 100 WATTS OUT AT 500/250 V.D.C.	$54.00
MODEL IA-1260-10: INPUT 12.6 V.D.C. 100 WATTS SQ. WAVE @ 117 V. 60 CYC.	$45.00
MODEL IA-124C-10: INPUT 12.6 V.D.C. 100 WATTS SQ. WAVE @ 117 V. 400 CYC.	$39.75

COMPLETE KITS — $9.00 LESS — ALL MODELS

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For further information, check number 42 on page 126.

I can give you personal service on helping you select better gear per dollar for your operating pleasure. Over 30 years experience. Big trades, easy terms, used bargains. GENE VAN SICKLE, W9KJF, *Owner.*

VAN SICKLE RADIO SUPPLY COMPANY

Permanent location
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One acre parking space on NE side. Indianapolis 5, Ind.

For further information, check number 43 on page 126.

GOOD BUYS — ALL NEW

TRANSFORMERS . . . all have 115 volt, 60 cycle primaries
Scope, 2500 v/3 mils & 2.5 v/1.75 a ....5 lbs.... ....$1.95
Scope, 6.3/1.85, 6.3/0.6, 700 ct/30, 525/5, 2.5/1.75, 6.3/0.6, 2 and 3 KV ins, upright shielded ....5 lbs.........$3.45
Power, Stancor P-4004, upright double shell, 800 vct/175 mils, 5 v/3 a, 6.3/2.5, 6.3/2.5 and 2.5/1.75 + bias tap. 10 lbs.........$5.95
Power, 790 vct/120 mils, 5/3, 6.3/4.4, 6.3/0.6, HS 10#. $2.95
Power, 550 vct/240 mils, 5/3, 6.3/11.1, 17/1.2, HS 14#. $3.45
Filament, 2.5/10, 6.3 ct/5.5, 6.3 ct/1, HS .. ..13 lbs.........$2.29
Filament, 6.3/22, 6.3 ct/2.4, 6.3/2.25, 6.3 ct/0.6, 9#.........$3.29

CATHODE RAY TUBES 3FP7....$1.00 ppd 5FP7....$1.29 ppd
3BP1 ...... $1.75 5JP2........$3.45 5GP1/5BP1XXX........$2.45

CHOKES . . . all are potted types, hermetically sealed
10 hy/500 mils, 100 ohm, 2000 v RMS test............30 lbs.........$6.95
10 hy/150 mils, 160/210 ohm.......... 5/6 lbs.........$1.69........2/$2.95
4 hy/60 mils, 412 ohm, 2400 volt test........1 lb. ....59c........2/95c

MISCELLANEOUS VALUES . . . read carefully, some will go fast!
Meter, 0-50 microamp, 2½" round...........................1 lb. $4.95
25K ohm, 160 watt bleeder resistor ....1 lb. 69c
Full wave xfmr-rect combo for 24 vdc/800 mils 5 lbs.........$2.59
Triple 20/400 octal plug-in electrolytic.............. 8 oz. 2/95c
1/32 amp Slo-Blo, 3AG fuses........10/39c........Box of 100 for $2.95
5.3 MC IFs by RCA, double slug tuned........5 oz. each........6/95c
455 KC IFs, very nice with schematic .. ..8 oz........ 79c
Skirted black knobs with indicator line, 2"............3 oz.........3/95c
TS-13 handset with plugs, complete.........................3 lbs.........$5.95
BC-610 tuning units 3 lbs.........$3.45........Complete set........$24.95
BC-610 RF coils ....2 lbs.........$1.95........Complete set........$10.95
Dynamotor, 6 volt/26 amp input, 600 volts/150 mils intermittent duty cycle ....14 lbs.........$6.95
Selsyns, Delco type II-A, C-56701 motor-reapeater........13 lbs. each ....natural brass finish....... $9.95........2/$17.95

VACUUM TUBES 701-A..... $3.95/pair 3B24........$4.95/doz.
717-A, 2X2, 1642, 958-A $2.95/doz 89Y, HY-615 $19.95/doz

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Send adequate postage with orders We refund any overage
All prices are FOB Sacramento

JOE PALMER
PO BOX 6188 CCC, SACRAMENTO, CALIF.

For further informaiton, check number 44 on page 126.

MODERN CONTROL [*from page 41*]

Parts List

T1-T2—Line to line split winding, Triad A-58X
T3—Plate to line, Triad A-51X
T4—Output transformer, Triad A-26X
T5—Interstage 3:1 Merit A2910 Beam Rotator & In cator, CD-AR22. Beam Brake, W.P.L. Co.
S1—SPST 25A switch or magnetic breaker
S2—DPST 15A Toggle switch
S3, S9—SPST 5A Toggle switch
S4—4P2 Position deck switch
S5, S6, S7—SPDT 5A Toggle
S8—Part of Lumiline Lamp
I1—Mininature Pilot Assay
I2—Lumiline Lamp
J1—6 prong receptacle (amphenol tube socket)
J2, J3—Double AC Line Recept.
J4, J5—Phone jacks
K101, K102, K103—Co-axial relays, Dow-key mfr.
K104—SPST Relay
K105—DPDT Relay advance

ready for operation. Its operation delive screen and plate voltage to the power ampl fier through relay (K101) as well as to th co-axial relays transferring the rf exciter ou put to the PA input and the PA output to th antenna relay. For phone patch operation, S connects the line to the line transformers (T & T2) which are connected in hybrid. Th phone line volume control is adjusted so th the line voice input modulates the transmitte properly. A phone jack is provided across th speech input for monitoring as well as for nu adjustment. The rf exciters, a Johnson Range and a home built SB job of the phasing typ are selected by the switch marked SSB-AM Operation of this switch supplies power t either unit and switches the rf output throug a co-axial relay.

Construction

The phone patch is built into a 4"x6"x2 steel chassis with cover plate for good mag netic shielding. A six terminal board make connections to speech input circuit of trans mitter, to receiver output and to the phon line. The phone line input is rf by-passed b two 1000 mmfd capacitors. A line to gri (T-3) transformer connects from line trans former T-2, to speech amplifier input, and line to voice coil transformer (T-4) connect from line transformer T-1 to the 3½ ohn receiver output. If your speech amplifier ha a low impedance input, T-3 may be eliminated Likewise, if your receiver has a 250 or 50 ohm output, output transformer T-4 may b deleted. In that event, a smaller phone patc chassis could be used. The balance control i the phone patch chassis is positioned so tha its shaft extends through the side of the contro cabinet. After initial adjustment, this contro need not be adjusted again. To adjust for null, phone one of your friends and have hir hang on to the phone, connect the phone patc switch to line and feed a signal from your re ceiver. This may be a voice signal or a 1k proximate) beat signal. Connect fones to speech amplifier monitor jack and adjust balance control for a null or minimum voice ıal.

That's all there is to it.

Set your receiver volume at proper level for ding the phone line, and it will not operate voice control circuit of the transmitter. e signal from the phone line will. A word caution: the line transformers tend to pick 60 cycle hum when the chassis is close to h a field. Hum pickup was experienced en the chassis was first placed near the tric clock and a more favorable position the cabinet was found for it. The 12x15x9 ity cabinet accommodates all the accesies without crowding. The cutouts in the forated front panel for the beam indicator clock were made with a pair of tin snips. other sections making up the front panel e metal scraps. As can be seen the 2 terıal boards and a double AC outlet provide connections to the equipment. A 6 prong eptacle is used to connect to the beam ror and brake. The one *kc* filter was made n an 85 millihenry toroid coil shunted by 25 mfd paper capacitor. The coil is a "surs" store item selling for twenty-five cents.

Visiting hams have admired the versatility this control unit and criticized my failure nclude a cold beer tap on it . . . now if I used a slightly larger cabinet . . . ■

ANSISTORS 1923 [*from page 35*]

The second circuit, sketched from memory ig. 2, was somewhat more advanced than first, and performed more consistently. s employed a silicon crystal which was ınted in soft solder, and then carefully oved, so that the crystal was supported by blobs of solder. Bias of either polarity applied across the two solder mountings, the catwhisker was usually a steel phonooh needle, pressed firmly into the face of silicon crystal.

erformance of this detector, on occasion, rather remarkable. It would receive more als than any other tested at the time, and apparent tone of the signals could be nged by altering the bias, or by applying vy transverse pressure (with a vise) to the tal. If memory serves right, the most sene point was reached just before the crysshattered under pressure. Silicon crystals ınted in brass (probably low-melting hard er) worked slightly better than those ınted in soft solder; but mounting in either od's metal or pure tin had no effect on the formance.

onstructional details of the time included use of red fiber spiderweb coil forms (black no good for some reason); the coils had to wound with green Litz wire (no other color

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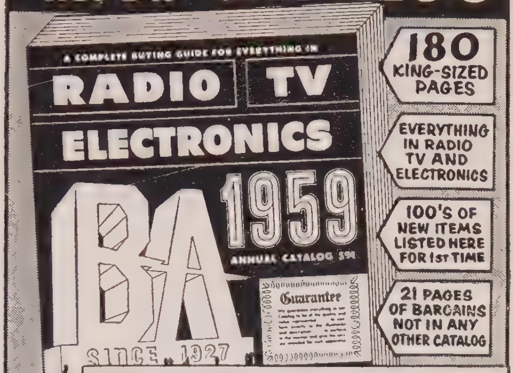
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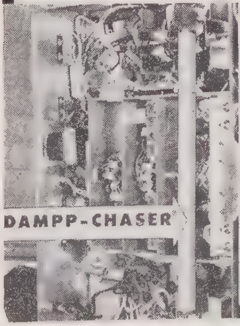

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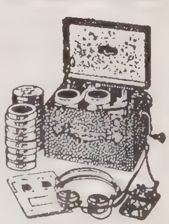

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would do); and they had to be boiled in Paro wax after completion, or they would not work The phone bypass condenser was customaril made from florist's tinfoil and cleaned photographic plates; but a few heretics found tha parts of the tinfoil and wax paper condenser included in Model T Ford coils, which wer also a good source of #40 wire for loadin coils, worked just as well.

Experiments with biased silicon detectors and similar crystal devices, ceased about 1924 as various telephone repeater tubes were "liberated" into amateur hands. Widely adopte was the "blooper" receiver, often consistin of a regenerative detector (Colpitts, Hartley Flewelling, etc.) and three stages of audio.

This brief excursion into the dim historica recesses of the wireless art raises a very interesting question. Did a large group of radic amateurs and experimenters, about 1923, develop and use a crude form of transistor, anc unknowingly fumble the ball, so that the official discovery of transistors, by staff member of the Bell Telephone Laboratories, was delayed by perhaps twenty years? ■

RCVR HOT ROD [*from page 38*]

resistance, loading on the *ift* is reduced to practical minimum and the *if* Q really soars A very beneficial side effect is the improvemen in s/n ratio due to the negative feedback inherent in all cathode followers.

Special attention should also be paid to th second detector system in any communication receiver. The usual series diode has all sorts o nasty little characteristics which do little t improve the tone quality and selectivity o our receivers. Firstly, the diode and avc filte loads the secondary of the last *ift* to a poin where it is as broad as Aunt Fannie's sea Second, diodes are notoriously non-linear, generating all kinds of audio distortion. Some attempt at removing the loading has been mad in the Super-Pro by the addition of an av amplifier with its own rectifier. However, audi distortion is still present. To eliminate most c the distortion and loading at one fell swoop install an infinite impedance detector. O course, these detectors are not suitable for us with the usual *anl* circuits, for obvious reason In fig. 7 we show a modified version of a diod detector which not only un-loads the *ift* secondary, but supplies very linear audio and mor than adequate bias to operate an *anl* and th avc line. Ignore the avc feed if this is used wit the Super-Pro, it already has an avc amplifie and rectifier, remember?

The last modification that should be mad to the receiver is to eliminate unwanted hu and frequencies outside the normal maximu intelligence audio band. Fig. 8 is an old tri used to eliminate hum harmonics. By changin the capacitor to an electrolytic as shown in fi 8 b, the choke is resonated at the fundament

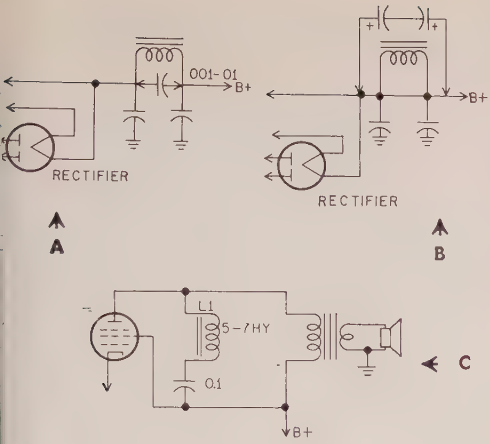

Fig. 8—Some methods that may be used to reduce hum as explained in text.

pple frequency and all residual hum is re-ıced to an inaudible minimum.

To tune out low frequency components in e audio amplifier, use 0.005 mfd coupling pacitors in the audio stages. Also remove thode bypass capacitors and insert a choke d capacitor series trap in the output as shown fig. 8 c. By-passing the 1st af plate to ground th at least an 0.005 mfd capacitor will give a easing 3 db or more per octave roll-off of e treble frequencies above 3 kc. Since most ceiver, and received, noise falls in the 4-10 spectrum with a peak around 5 kc, this ll-off will serve to mitigate the noise somehat without seriously affecting the crispness of eech needed for good legibility.

In the event that additional sensitivity is sired, after all the de-noising work has been ne, check your tube manuals for higher gm pe tubes which are interchangeable (with odifications to the circuits, if necessary) with tubes in your set. I'd suggest you try to ck to standard types as they're cheaper and ore easily obtained, although using premium ade tubes is a must. In many sets, especially BC-312, 342, 348 series receivers, use of a G7 in the 1st *rf* position will make the set off the bench! Inasmuch as this type tube a gm of 9000 and an equivalent noise reance of only around 1,700 Ω it's use is nost de rigueur if increased sensitivity with reased noise is sought after.

t is our firm's custom to turn out revamped eivers such as are mentioned herein with ratios of 10 db at 1 μV input, output erence level 50 mW.

Although we resort to mass production techues, the hints outlined here are by no means side the average ham's ability and experie. Following these hints, with a few of your pet ideas thrown in, will result in a topch receiver which will outperform all but most expensive new models.

Again, 73, es much dx! ■

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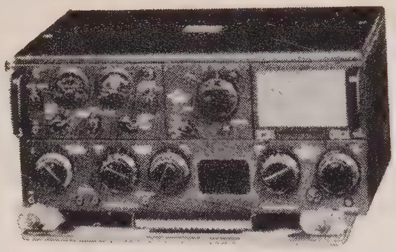
AN/ART-13
100 WATT TRANSMITTER



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Less Tuning Meter $54.50

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BC604 TRANSMITTER 20-27 MC NEW $ 7.95

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T-19—3-4 MC XMTR. EXC. $ 5.95

BC-458—5.37 MC. EXC. $ 5.95

T-23—100-156 MC XMTR. NEW $13.95

R-28—100-156 MC RECEIVER. EXC. $15.95

TA-12 XMTR, 100 Watt. EXC. $19.95

MP-28 MODULATOR and 28 V. DC Power Supply for above. EXC. $14.95

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Phone: CAlumet 5-1281

For further information, check number 50 on page 126.

FOR SALE (Cont'd)

FOR SALE: 3 ea. NEW 4-400A tubes @ $20.00 ea. Gonset G-66B receiver factory modifies to E Model complete with universal power pack. $190.00. Lesly W. Williams, P.O. Box 794, Nutting Lake, Massachusetts.

4 X 150 A tubes, $9.95 each, new surplus, guaranteed, meet Jan specs, postpaid, H&C Sales, 666 Elaine, Pittsburgh 36, Penna.

BARGAINS: Reconditioned & guaranteed, 32V-2 $349.00; 32V-3 $495.00; B&W 5100 $299.00; Viking I $145.00; Ranger $199.50; HQ-129X $159.00; HQ-140XA $199.95; HQ-100C $159.50; HQ-110C $215.00; SX-96 $199.00; NC-300 $319.50; NC-125 $139.00; NC-173 $139.50; NC-109 w/calibrator $179.50. Write for complete list. We trade. Complete stock of new gear. Terms with only 10% down. Write Ken, W0ZCN or Glen, W0ZKD for deal. Ken-Els Radio Supply Co., 428 Central Avenue, Fort Dodge, Iowa.

RG 8U CO-AX CABLE. 100 ft. lengths .... $6.75. Can supply any quantity in one continuous length at proportionate prices. ADVANCE ELECTRONICS, 6 West Broadway, New York 7, New York.

McELROY TAPE PULLER. 2-speed, 110 V AC, Rheostat control, mounted in wooden carrying box. $7.50. BUD BLAN, 597 Western Park Drive, West Hempstead, L. I.

FOR SALE: Collins 32V2 $350.00. National NC183D $225.00 or both for $525.00. Complete Morrow Mobile & Fixed Station with AC and Mobile Power Supplies $450.00. Sidney Gogel W2FUR, 1096 Laux Place, No. Bellmore, N. Y. SUnset 5-6876.

ALUMINUM for every Ham need. Write to Dick's, Cherry Avenue, Route 1, Tiffin, Ohio for list of tubing, angle, channel, castings, plain and perforated sheet, and complete beam kits.

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FOR SALE: Central Electronics 10B $139. W6BLZ, 528 Colima St., La Jolla, Calif.

FOR SALE: Re-perforators, W-U 10A. Require external distributors. Same as at Chicago CATS meeting uses standard tape. $4.98 plus postage on 12 lbs. no C.O.D. Victor Lome, 745 Brummel Street, Evanston, Illinois.

FOR SALE: Hallicrafters SX-100, Esc., with R-46-B speaker, $250 or best offer. Also, Pentron NL-1 tape recorder, good, $75. (going to college). John Morley, W9MSU, 101 Gregory-Tripp, University of Wisconsin, Madison 10, Wisconsin.

FOR SALE: Wireless transmitter with extras for $20.00. One tube intercom, $20. Dan Short, 111 Chestnut St., Garden City, N. Y.

COMPLETE RIG FOR SALE: Globe Scout 65A, Hallicrafters S-76, with matching speaker, and all accessories. Write for info. Cecil A. Moore, W5DXP, 302B N. Main, College Station, Texas.

FOR SALE: NC-98 Receiver, perfect condition. Best offer, $100 or over. W5ZNN, Men's new Dorm. I, S.F.A. State College, Nacogdoches, Texas.

FOR SALE: Transmitter, 1KW CW, 625 voice; 300v 1.0 amp supply, 4-65 plate modulator, 4-400A final. Rack mounted. Take $250. Tom Leal, 1254 24th St. Hermosa Beach, California. W6ITX. FR 9-9488.

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For further information, check number 51 on page 126.

RADIO BOOKSHOP

When are you actually going to start learning something about radio? We've left out all the unnecessary stuff and concentrated on those books that are really top notch for hams. Beginners should have #11-13-23-24. The next step is #21-22-28-32. #16 will help make QSO's a lot more interesting. #1-2-5-25 are important for developing your technical education and giving you a good reference library. #9 will help you get a commercial license.

13 **Reference Data, 4th Edition**
The IT&T handbook, 1152 pages. Data, data $6.00

16 **Ham Register by W3VKD**
Inside scoop on over 10,000 hams. These are the fellows you hear on the air every day $5.00

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A-Z of ham teletype, supply low, very popular. .$3.00

21 **VHF Handbook by W6QKI**
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22 **Beam Antenna Handbook by W6SAI**
Practical, includes both theory and construction $2.70

23 **Novice Handbook by W6TNS**
Receiver, transmitter and antenna theory and construction for the Novice and Technician. Terrific. . . .$2.85

24 **Better Shortwave Reception by W6SAI**
Fine handbook for SWL'ing, long needed......$2.85

25 **Mathematics for Electricians & Radiomen by Cooke** The standard text book in this field. $5.50

26 **Surplus Radio Conversion Manual I**
BC-221, 342, 312, 348, 412, 645, 946, 1068A. SCR-274, 522. TBY, PE-103, etc.. . . . $2.50

27 **Surplus Radio Conversion Manual II**
BC-454-459 Xmtr-Rcvrs; APS-13; ARC-5 VHF Xmtr-Rcvrs; BC-357, 946B, 375; TA-12B; ART-13; AVT-112A; GO-9; LM; etc. $2.50

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FOR SALE: HQ-140XA receiver, matching speaker. DX-20 transmitter, Heath VFO, vibroplex bug, D-104 microphone, radio parts. All equipment in excellent condition. Brian Stuckey, 1920 Avenue C, Gothenburg, Nebraska.

GLOBE KING 500C. Perfect condition. Pick up and try out at QTH. Best offer over $500.00. Joe Krantz, Box 261, Charleston W. Va.

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WANTED—B&W HDVL coils—Advise condition and price —W1BB, Stewart S. Perry, 36 Pleasant Street, Winthrop, Massachusetts.

WANTED: TELETYPE TG-7 and Model 15 and parts, printers and reperforators etc; **COMM'NS REC'V'RS AND XMTRS.** e.g. BC-610-E, -I, BC-939A, Collins 51J, 17L3, -4; R-388 and R-390/URR; 18S-2, -3; ARN-14 and -30; APR-9, -10, ARC-21, -27 etc; APS-31, -33; and **TEST EQP'T.** with TS- or I- prefix. We pay freight. AMBER INDUSTRIAL CORP. 75 Varick St., N. Y. 13, N. Y.

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AUCTION, Ft. Lauderdale, Fla., Saturday, Feb. 14. Details here next issue.

OVERSEAS *[from page 87]*

tion finding on eighty. If you are interested in how big the unit is—the *all-band* transceiver, as it might properly be called, is used in a Simca Aronde, which is certainly not a very big car. The October issue also describes a fully transistorized receiver for 40 and 80 meters. The unit, designed by F8GB, uses eight transistors.

Maybe we talk a bit too much about our amateur bands, but then again—what is more important to us? **Old Man,** Sept./Oct. 1958 HB, in an article about the Region I conference of the IARU, again brings to mind the fact that the problems we face are worldwide. Italy, e.g. may lose even the last 30 *kc* in the 80 meter band. They have been denied permission to operate amateur TV and there is hardly any hope for getting an allocation around 50 *mc*. In Great Britain as well as in Germany the 11 meter band is assigned to radio-controlled models. Only in a few countries is there hope for new additional frequencies. Sweden may possibly get a permanent allocation from 50.0 to 50.5 *mc*. We do not believe that the situation is as good in any other country as it is in Luxemburg, where the telecommunications inspector is a ham. So just let us keep hoping for the best and let us use our available bands to the fullest extent. An unused band is soon a dead band.

In closing we wish to thank all those hams who either individually or through the companies they work for forwarded data on the interchangeability of tubes (see October column). Response came not only locally but also from several overseas hams.

73, Tom, K2VB

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EECH CLIPPING [*from page 34*]

e oscilloscope is connected at the output of 6146 modulator loaded by a resistor. The ward tilt on the clipped wave turns into an proximately level square wave when the modtor is connected to the class C stage and dc ws in the modulation transformer secondary. the event that the output waveform is not evel square wave, the value of the condenser the clipper plate circuit, fig. 1, may be varied bring the proper conditions. The value will in the vicinity of 0.32 mfd.

These modulators as well as similar ones ve been used by the authors for several rs. The results obtained have been most tifying, especially when a DX contact comes k and says "Your carrier dropped to S1/2, I, but I could still copy your audio FB." ■

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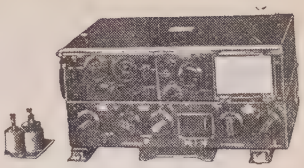

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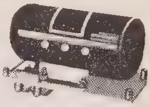

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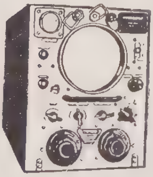

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TERMS: Money Back Gtd. $2 min. order F.O.B. N.Y.C. Add Shpg. charges or for C.O.D. 25% Dep. Tubes Gtd. via R-Exp. only.

Prices shown are subject to change.

111YC Liberty St., N.Y. 6, N.Y., RE 2-6245

"TAB"—*THAT'S A BUY!*—BARGAINS!!

AN-ARR2/RCVR as is/good parts . $1.59
RDZ/USN 200-400 Mcs Rcvrs As Is .. $25
Slim Jim Dynamic Mike Hand or Std $3.49
Neck Mike Carbon New ....89¢@, 3/$2
60Mc's/IF-Strip $5; 30Mc's/As is ... $3.00
866A/2 Combo & Fil XFMR/7.5KV Ins 5.98

Xmtting Mica's .006 @ 2500V. 5 for .. $1.00
Relay 4PDT/3Acts/12 to 24VDC $1@, 6/$5
Hvy Dty 115V/60Cy Selsyns. 2 for... $9.00
Miller 2.5MH/2.5&5Mtr Chokes ....8/$1.00
Vibrators 6 or 12VDC $1.49@; 4/......$5.00

Blower 24VDC/100CFM $2.98
Blower AC/Miniature 6&12VAC $1.00
Co-Ax Cnnctrs PL259A/SO239/40c ea. 6/$2
AN Voltmeter 0-30VDC $2.49@, 3 for $6.00

RF-MTR GE/475 Ma & 5 Amp $4@, 2/$7
DC-METER Dejur 800 Ma/3½" $3@, 2/$5
DC-METER One Ma/4" Rect $5@, 2/$8
RF-MTR Weston 750Ma ....$4@, 2/$6
DC MTR One/Ma/scale No #'s $2.50
DC MTR 100Ma/2½"................$3@, 2/$5
DC MTR 1 Ma/4" Rect. ....$5@, 2/$8

TRANSFORMERS all 115V/60cy/1Ø

6V @ 8A, 5V @ 3A & 1200VCT@200ma $5
TPF52/778VCT @ 200ma, 5V @ 3A, 6.3VCT @ 5A $4 @ 3 for.....................$11
TPF/540VCT @ 30ma/6.3V @ 2A............$2
TPF61/500VCT @ 70ma & 6.3V @ 4A $3

TPF62/550VCT @ 250ma & 6.3VCT @ 2.5A & 12.6V @ 3.5A, & 5V @ 2A $5
TF02/2.5VCT @ 10A/5KV.. .... $4
TR400R/2x16V @ 1A ea.........................$3.45
TF05/7.5VCT/12A/15KV KENYON $9
TF27 is 10VCT/5A or 220V Pri 20V @ 5A
Kenyon H'sld ...... Special $4.95 @, 2 for $7
TPX is 4760 VCT @ 300 ma $16.95

FILTER & SWINGING CHOKES

CH1029 CHOKE 8 Hy @ 750ma..............$12
CH1030 CHOKE 6 Hy @ 1.25A...............$18
CH1034 CHOKE 5 Hy @ 500ma...............$6
UTC/CG40/10 Hy @ 200ma $3 @ 2/$5
CTC/RS8250/8 Hy @ 250ma/90Ω........... $5
STAN/C2701/3-12 Hy @ 350ma/80Ω....$10
KEN/T510/6-19 Hy @ 300ma/125Ω.... $9
KEN/3-14 Hy @ 1.1 Amps/5KV..........$25

"TAB" HD'QTRS for TRANSISTORS!

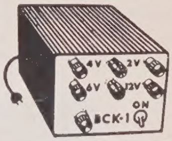
2N38	$.98	2N255	$1.30	2N441	$3.00
2N155	3.25	2N256	1.45	2N234A	1.36
2N156	4.45	2N277	4.50	CK721	2.35
2N180	3.65	2N362	1.31	CK722	.95
2N181	4.45	2N363	1.15	CK768	1.49

Postpaid 48 States Orders $10

WE BUY! SELL & TRADE

Send 25¢ for Bonus Catalog!

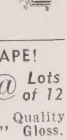
MULTI-CHARGER
2V, 4V, 6V & 12
VOLT BATTERYS
At up to 4 AMPS
KIT or BUILT!!!



Charges 2—4—6 & 12 volt batteries. Kit BCK-1 $11. Built $12.75

BCK-2 Charger-Kit for 6 & 12 Volt Batteries up to 3 Amps. BCK2 Kit $7; Built $9.

NEW DC POWER for TRANSISTORS! New low-cost 25 Volt one amp filtered 1% ripple power supply. Same as specified in transistor manuals G.E., RCA. Ideal for powering transistor circuits, rugged & small in size! Preassembled kit U-build B25V1ACK $10 or assembled B25V1AC $12.



Transistors! Filtered Power Supply Kit used to power transistor circuits, amplifiers, etc. Delivers 12VDC at 2AMPS filtered less than 0.5% ripple or 28VDC at 1A, 3TPSK2 Kit $18; TPS2W assembled & wired $24.
115VAC Inpt Transformer & Full Wave Bridge Rectifier for 12VDC @ 2AMPS, or RECTRAN KIT RT1K..............$4.50
RT2K Kit 12 or 18VDC at 6 AMPS $9.00

"IRISH" HI-FI RECORDING TAPE!

1200 Ft.—7" Reel Money Back Gtd! $1.45 @ *Lots of 12*

7" REEL, 1200 FOOT Highest Quality Precision Coated & slit. **"ERIN"** Gloss. **"ERIN"** processed constant output. Noise Free. **Freq. 7½ IPS 40-15 KC Oxide Wnd. In. @ $1.69 ea. 3 for $5.**

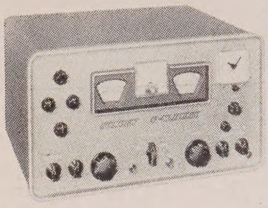
Wanted 304TL Tubes & ALL TYPES!!!

Top $$$ Paid For 304TL Sperry & Raytheon, RCA, GE, Syl, Wstghse, Eimac etc!

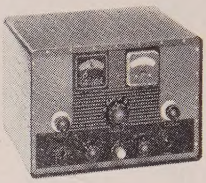
For further information, check number 56 on page 126.

If it's NEW—
Allied has it in stock—FIRST

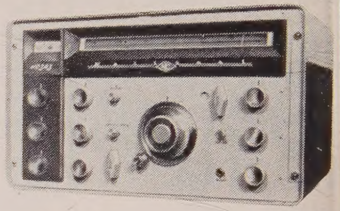
HERE'S WHAT'S NEW:



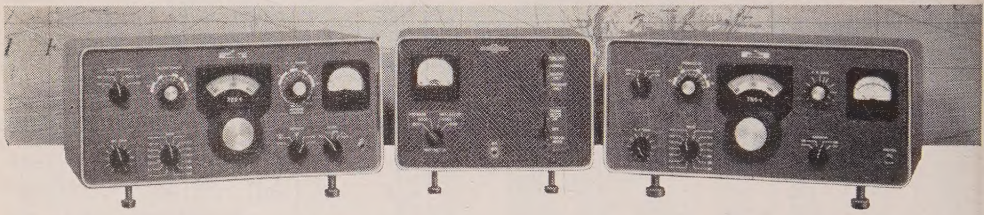
Hammarlund HQ-145C
General Coverage Receiver
$279.00



Johnson Challenger Kit
Phone-CW Transmitter (80 thru 6 meters)
$114.75



National NC-303
Amateur Band Receiver
$449.00



Collins 32S-1
SSB Transmitter—175 Watts PEP
$590.00

Collins 312B-4
Speaker Console with accessories
$185.00

Collins 75S-1
SSB Receiver (10 thru 80 meters)
$495.00

FREE 452-PAGE ALLIED CATALOG

It's packed with the largest selections of station gear—it's your complete Buying Guide to everything in electronic equipment and supplies. If you haven't a copy of the 1959 ALLIED Catalog, write for it today.

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Try us...write today...describe your equipment, and see what a sweet deal we'll give you on the new gear you want. You'll get a "King-Size" trade-in every time at Allied!

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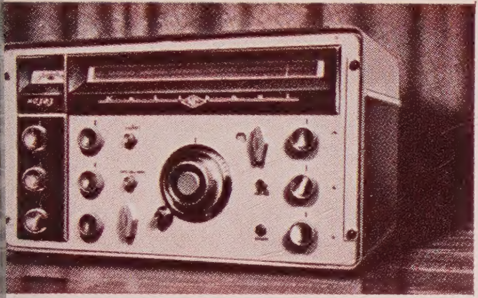
For further information, check number 57 on page 126.

ational News Dial

Published periodically by the **NATIONAL CO. INC., MALDEN 48, MASS.**

EW NATIONAL NC-303 OVERNIGHT SUCCESS!



Hams Throughout America Enthusiastic in Praise of New DeLuxe Receiver

Since its introduction in October of 1958, the new NC-303 has enjoyed overnight acceptance. National Co. distributors report "exceptionally good" sales during Christmas season, and many a lucky ham will find an NC-303 under his Christmas tree.

The NC-303 is a super-deluxe "ham band" receiver offering several exciting new features: Front panel SSB selector with exclusive, new "IF SHIFT" for instant choice of sideband . . . eliminates retuning or detuning. 5-position IF selector offers choice of sharp, SSB-1, SSB-2, medium and broad selectivity. New tone switch provides attenuation of highs, lows, or both for maximum readability.

New dual noise limiters . . . separate automatic noise limiter for AM, separate double-ended manual limiter for CW and SSB. New "Q" Multiplier with 60 db deep rejection notch, may be tuned continuously across the entire passband, has separate notch frequency and notch depth controls. New 40-1 tuning dial with logging scale, plus new fine tuning vernier dial drive for super precision CW and SSB tuning.

Exclusive new WWV converter provision . . . no interference with dial calibration or frequency coverage . . . accessory calibrator provides one microvolt sensitivity on 10 mc WWV. New "fast attack—slow release" AGC. Crystal controlled 2nd converter oscillator provides excellent inherent stability from cold start. Sensitivity less than 1.0 microvolts. 10 dial scales cover all amateur bands . . . exclusive converter provision for 6, 2, and 1¼ meters.

These are only a few of the many features. See your National Co. Distributor, or write for full specifications. Suggested list price $449.00.

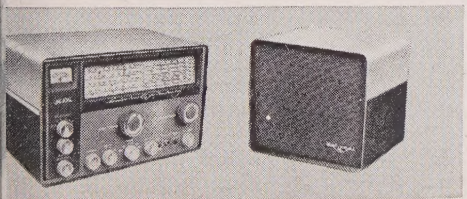
For further information, check number 2 on page 126.

NAL CO. DISTRIBUTORS OFFER $17.50 SPEAKER WITH NC-109 OR NC-188 RECEIVER!

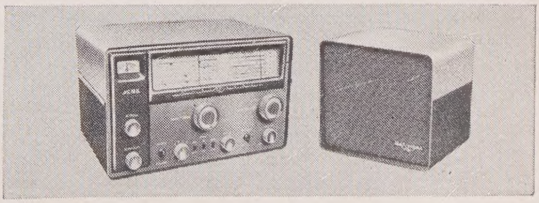
ited time only, most
o. distributors offer
nity to buy now and
0 on the purchase of
NC-109 or NC-188
You get the receiver
ker . . . BOTH FOR
E OF THE RECEIVER
See your National
utor now and save.

vers 540 kc to 40 mc
s. Calibrated band-
10-80 meter amateur
clusive "MICRO-
r provides 5 degrees
sharp selectivity.
1-2 microvolts with
l/noise ratio. Sepa-
frequency oscillator
with temperature compensated ceramic coil forms reduces drift to .01% or less. Separate product detector for SSB makes the NC-109 America's lowest priced SSB receiver.

NC-188 covers 540 kc to 40 mc. Directly calibrated for 4 general coverage ranges and 5 bandspread ranges for 10-80 meter bands. Has RF amplifier stage, two IF stages and two audio stages. Has tone control, antenna trimmer, S-meter, separate RF and AF gain controls, automatic noise limiter. Has temperature compensated and ventilated high frequency oscillator for increased stability.

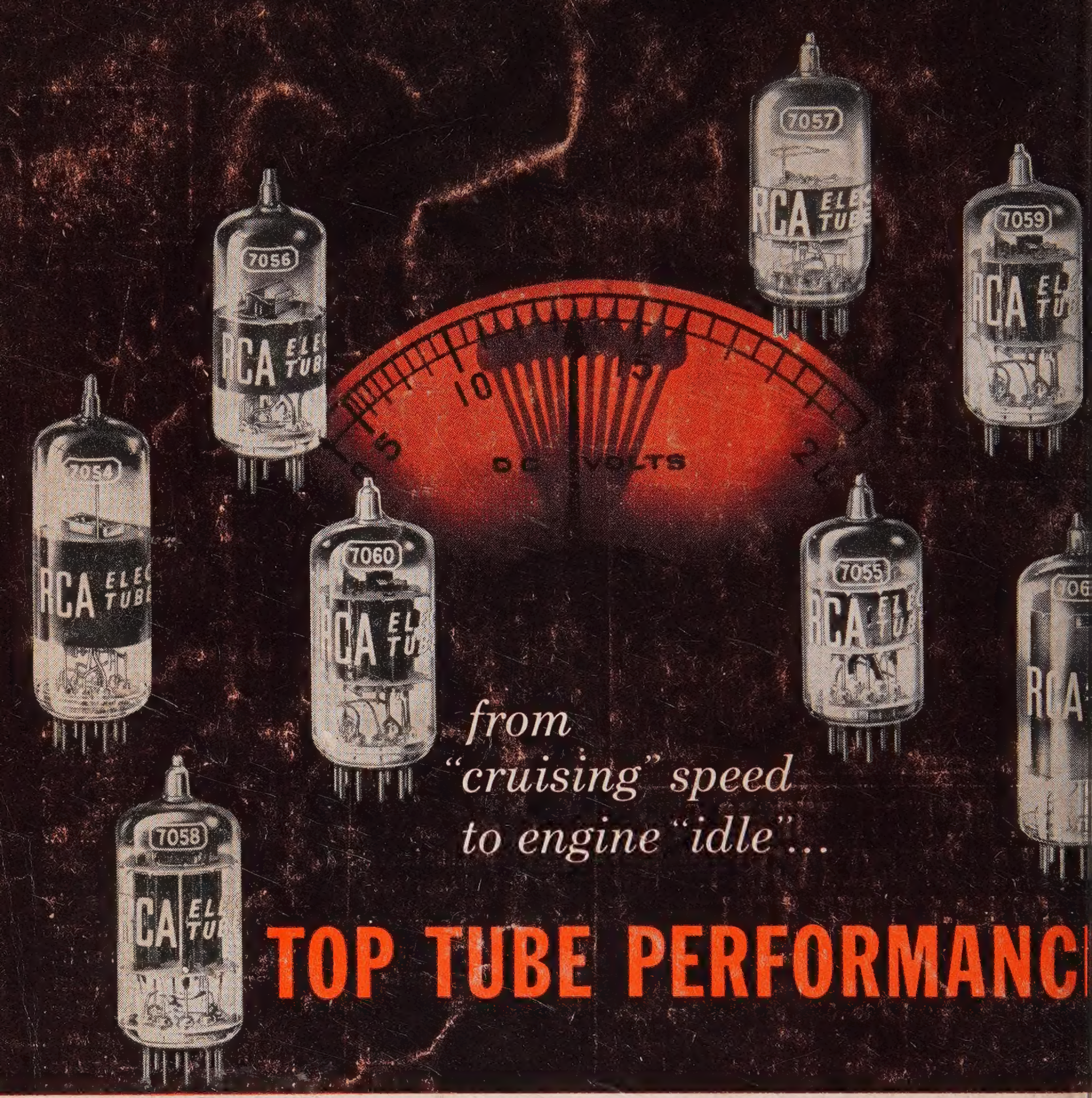


-109 PLUS NTS-1 SPEAKER Regularly $217.45



NC-188 PLUS NTS-1 SPEAKER Regularly $177.45

NOW ONLY $15.95 DOWN, full suggested cash price $159.95



RCA Announces a New, Comprehensive Line of Mobile Communications Tubes for 6-cell Storage-Battery Operation.

AGAIN, RCA is FIRST—with a line of communication tubes that insures reliable service in mobile equipment operating with a terminal supply voltage *ranging all the way from 12 to 15 volts (they will take momentary excursions from 11 to 16 volts)!*

Here is a line of tubes for amateur mobile service that can take the extra plate and screen dissipation at "cruising" speeds—and yet deliver satisfactory performance at engine "idle". In addition, the 13.5-volt heaters are specifically designed and controlled to withstand the frequent "on-off" heater operation normally encountered in mobile use.

Check the list for the types you need. They're available at your RCA Industrial Tube Distributor. Tube technical data is available from RCA Commercial Engineering, Section A-15-M, Harrison, N. J.

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RADIO CORPORATION OF AMERICA
Electron Tube Division ***Harrison, N. J.***

NEW RCA 13.5-VOLT MINIATUR
FOR MOBILE COMMUNICAT

RCA-7054—Power Pentode. For
power amplifier, oscillator, frequency
up to 40 Mc. Also for modulator,
amplifier.

RCA-7055—Twin Diode. For low-c
tifier, detector, speech-clipper.

RCA-7056—Sharp-Cutoff Pentode
plifier and rf amplifier up to 45 Mc.

RCA-7057—Medium-Mμ Twin Tr
amplifier in cascode-type circuits up

RCA-7058—High-Mμ Twin Triode
inverter, resistance-coupled am
oscillator.

RCA-7059—Medium-Mμ Trio
Cutoff Pentode. For oscillator-mix
quencies up to 40 Mc. Triode unit als
vhf oscillator and, connected as diod
perveance rectifier in noise-squelch

RCA-7060—Medium-Mμ Triode-P
tode. Triode useful for reactance
pentode for class C rf power amplifi
quency multiplier, up to 40 Mc.

RCA-7061—Beam Power Tube. F
amplifier